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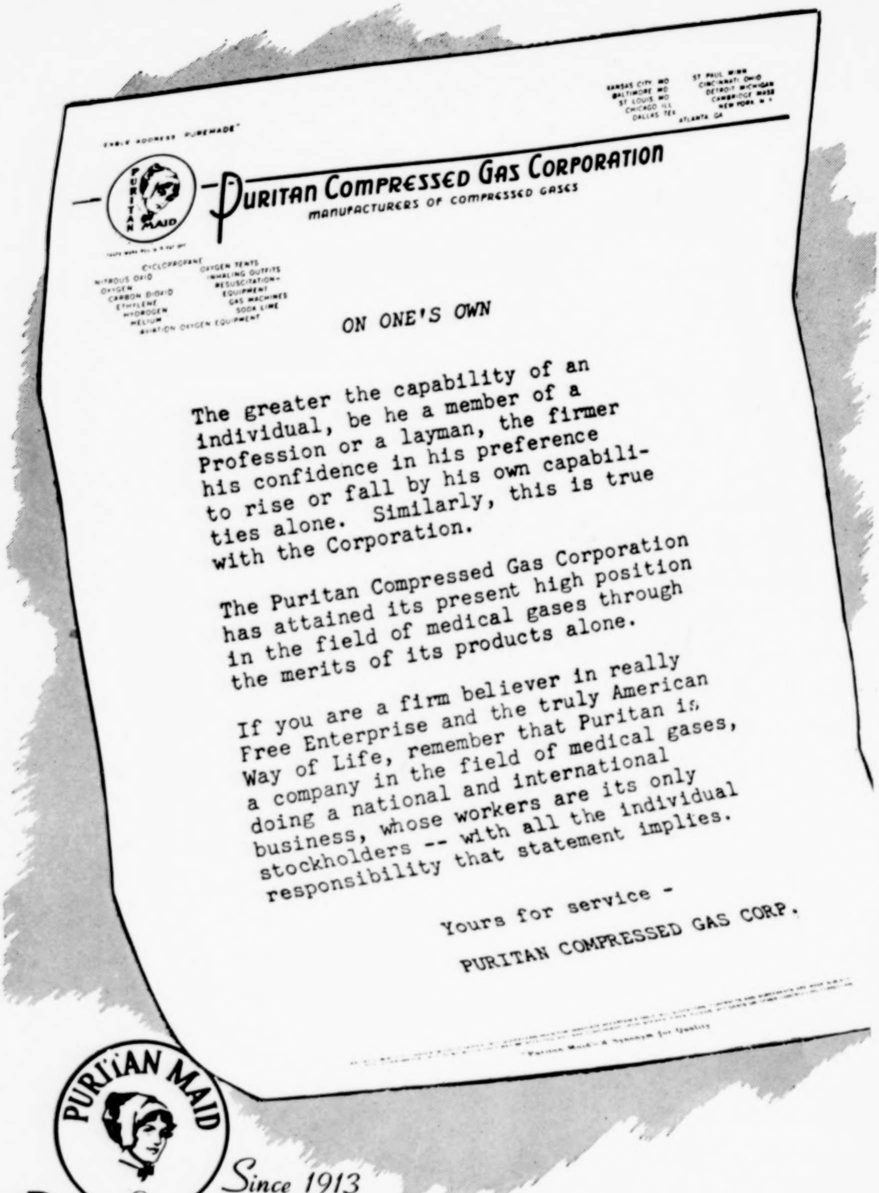
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1. Goodman, L., and Gilman, A.: The Pharmacological Basis of Therapeutics, New York, The Macmillan Co., 1947, p. 58.

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OPINION REVIEW

Practical Nurses and Postanesthesia Care

[The trend towards using practical nurses in the postanesthesia care of the unconscious patient prompted us to ask six nurse anesthetists in representative midwestern hospitals to tell us what they thought about the practice. The five answers received were in response to these questions: What is your opinion of the advisability of the use of the practical nurse in the care of patients recovering from anesthesia? Have you had any experience with the problem?

Anesthetists from other parts of the country will be asked to contribute letters on the subject to subsequent issues of the JOURNAL, but any one who has a comment to make is urged to send it in. We believe the problem to be one deserving thorough discussion.—EDS.]

* * *

The advisability of the use of practical nurses in the care of patients recovering from anesthesia, to my mind, depends entirely on the type of training they have been given to fit them for this work. If they have been well trained in the postoperative complications of anesthesia, know how to meet such emergencies, and above all know their limitations and when to call for help, I see no reason why they cannot perform efficiently. I also feel that they should be continually under the supervision of a registered nurse.

Practical nurses are used in this capacity here at Cincinnati General Hospital and have proved to be very satisfactory. When I was asked my opinion on this subject, I picked four at random and had them answer the following questions without an opportunity to look up the answers:

1. If an unconscious patient returned from surgery suddenly stopped breathing, what would you do?
2. Describe cyanosis, and what would you do to remedy it?
3. If an unconscious patient returned from surgery began vomiting, what would you do?
4. How would you administer artificial respiration?

Their answers were surprisingly good and showed that they had been well trained in what to do in such emergencies and had an understanding of the problem of the postanesthesia patient.—MARY A. COSTELLO, R.N., Cincinnati General Hospital, Cincinnati.

* * *

The practical nurse in the hospital field is new. Until her training is standardized, I do not believe it would be feasible to institute this type of postoperative care for the anesthetized or unconscious patient.

Perhaps a definition of the term practical nurse would be advisable, as well as knowledge of whether or not she is a graduate of a one year course for practical nurses. Next, the physical set-up of the hospital in which she is employed would play an important role. There should be

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adequate supervision. In this way, the practical nurse would be properly trained in the care of the sick, the unconscious, and the anesthetized patient.

The practical nurse would then prove a valuable addition to our nursing and anesthesia staff by doing, for the unconscious and anesthetized patient, what the graduate professional nurse does now.

We have practical nurses in practically every department with the exception of surgery. The nursing staff is very pleased with the way these nurses assume responsibility. However, they do nothing for the acutely sick, but they give nursing care to the convalescent patient. This relieves the graduate professional nurse for the giving of medications and feedings. As I understand it, the practical nurse gives no medications nor feedings and does not relieve for dinner hours.—MABEL E. COURTNEY, R.N., Grace Hospital, Detroit.

* * *

With the ever present shortage of nurses, the question of the care of the unconscious patient is a problem. A good number of hospitals have tried to overcome this difficulty by having a recovery room. Whether the hospital has a recovery room under the direction of the training school office or the anesthesia department, the practical nurse is employed to fill in where there is a shortage of registered nurses.

The practical nurse does not take the responsibility for the immediate postoperative treatment or care of the patient. This, I feel, is correct as the practical nurse's training is limited, and she is unfamiliar with the immediate postoperative and postanesthesia complications that may arise.

It is apparent that there are many duties in the recovery room that can be delegated to the practical nurse, but it is this person's opinion that the actual bedside care of the patient should be given by a registered nurse who has had experience in emergency and resuscitative measures.—MARTHA LUNDGAARD, R.N., Minneapolis General Hospital, Minneapolis.

* * *

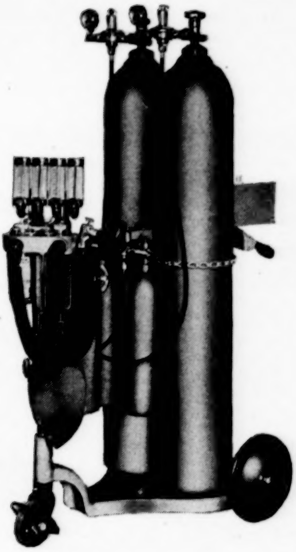
Immediately after an operation, surgical patients need the best possible care and attention for several hours. It does not seem reasonable that this can be provided by attendants less skilled than graduate registered nurses. Rather than lessening the quality of postoperative care by the use of practical nurses, it is my contention that more emphasis should be placed on the postoperative recovery room, with graduate nurses in attendance and with the anesthesia staff available for immediate postoperative care and supervision.—EDITH HELEN HOLMES, R.N., Norwegian-American Hospital, Chicago.

* * *

Since our hospital does not employ practical nurses, I do not have any experience upon which to base my comments.

I believe that using practical nurses for the care of patients recovering from anesthesia is placing very heavy responsibilities on their shoulders.

If owing to the shortage of trained nurses, an institution has to use this type of personnel, they should receive very thorough training in this specialty. Special emphasis should be placed upon recognizing shock and the signs of respiratory difficulty. They should be taught how to institute emergency treatment for these difficulties while getting more experienced help. A nursing supervisor should always be close at hand.—LILLIAN G. BAIRD, R.N., University Hospital, Ann Arbor.



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Something to Think About

1949 Facts about Nursing[1] contains some stimulating data. In the eleven states with professional nurse populations over 10,000, the interstate movement showed several noticeable gains and losses. Ten times as many out of state nurses were licensed in California as left to be licensed elsewhere, while four times as many nurses left as entered Pennsylvania. Connecticut, Michigan, and Indiana showed slight gains. Massachusetts, New York, and Ohio had substantial losses, and New Jersey and Texas minor losses. Ten of the fifteen states with the largest populations per active nurse had more losses than gains. These facts on the migratory habits of nurses are interesting. Some of the other facts are reason for doing a little serious thinking.

In the spring of 1949, 506,050 professional nurses were maintaining registration in the United States and territories. For every three of these who were active, two were inactive, total number of active nurses being 300,535.

According to the A.M.A. report on 6,355 hospitals in 1948, 230,059 professional nurses were in hospitals or schools of nursing; 64,627 of these were employed in the capacity of administrator, instructor, supervisor, or head nurse. This left 165,432 professional nurses (including 17,277 part-time general duty nurses, 33,939 private duty nurses, and 10,175 unclassified nurses) to do the work. In addition, 141,834 practical nurses and attendants, 35,788 orderlies, and 35,867 ward maids were employed as paid auxiliary workers in hospitals. This gives a ratio of more than one auxiliary worker to one supervised professional nurse. Because of the permissive nature of practical nurse laws in all but one of the twenty states having such legislation, only one of five of the 141,834 practical nurses was licensed.

By comparing these figures with those for 1945 used by Dr. Esther Lucile Brown in *Nursing for the Future*,[2,3] we find some interesting percentage increases: a 49 per cent increase in general duty nurses, a 77 per cent increase in practical nurses and attendants, and a 9 per cent increase in supervisory personnel (supervisors and assistant supervisors, head nurses and assistant head nurses). In 1945 the ratio of supervisors to general duty nurses to practical nurses and attendants was 10:18:17. In 1948 the ratio was 10:24:28.

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[1] 1949 *Facts about Nursing* (New York: American Nurses' Association, 1949).
[2] Brown, Esther Lucile: *Nursing for the Future* (New York: Russell Sage Foundation, 1948), p. 52.
[3] J.A.M.A. **130**:1084, Apr. 20, 1946.

With the trend toward the use of the practical nurse in the postanesthesia care of the unconscious patient, these statistics raise some serious questions. Is the proper solution to the shortage of nurses the employment of auxiliary workers without a compensatory increase in supervisory personnel? Even if supervised, can the practical nurse give adequate postanesthesia care to the unconscious patient? Where should a line be drawn between safe and unsafe practices?

In the hope that anesthetists generally would realize that here is a condition that should be brought under scrutiny, the *Opinion Review* section in this JOURNAL is being devoted to a discussion of the problem. A related phase is treated in the *Book Review* section where an appraisal is made of the content of texts for practical nurses.

Although the anesthetist is limited in what she can do to modify hospital policy with respect to job allocation, it would seem doubly important for her to be overly conscientious in her own area of postoperative care in those places where practical nurses are being used.

THE USE OF AN ELECTRO-MECHANICAL RESPIRATOR IN CARDIAC SURGERY

Miriam G. Shupp, R.N.,* and Gertrude M. Genskow, R.N.
Cleveland

The purpose of this article is to describe a new electro-mechanical respirator, the Rand-Wolfe, and to present the results obtained in the first forty cases in which this respirator was used. All operations in the series were performed by Dr. Claude S. Beck at the University Hospitals of Cleveland.

The development of the Rand-Wolfe respirator was an outgrowth of the use of mechanical control of breathing, with the employment of the Mautz respirator,[1,2,3,4,5] in the research laboratories of Dr. Beck at the School of Medicine, Western Reserve University. Dr. Beck, Mr. Kenneth Wolfe, Dr. Beck's laboratory assistant, and Mr. H. J. Rand III collaborated in its design and construction. The respirator was put into clinical use in the operating room at University Hospitals of Cleveland in June 1949.

The use of the Mautz respirator and the technic and advantages of mechanical control of respiration were reported previously.[1,4,5] The principle by which lung ventilation is effected mechanically with the Rand-Wolfe respirator is similar to that employed in the Mautz respirator. Pulmonary ventilation is accomplished by intermittent positive pressure with a gradual increase of pressure to the desired peak, followed by a sudden release to atmospheric pressure. This rhythmic alteration of pressure is produced in the Rand-Wolfe respirator by an electrically driven motor, whereas in the Mautz respirator compressed air is utilized for this purpose. The pulmonary ventilation maintained by both of these respirators is similar to that which may be produced manually by exerting pressure intermittently on the breathing bag, i.e., the lungs are inflated slowly and allowed to deflate without resistance.

The numbers used in the following explanation of the mechanics of the Rand-Wolfe respirator refer to those appearing in figures 1 and 2. This respirator is equipped with a 1/6 hp. explosion-proof electric motor and an explosion-proof "Off-On" switch (*10*) and operates on alternating current. (The machine should be grounded if the local electrical code requires grounding of motor-driven anesthesia equipment.) The breathing bag (*3*) is located between two aluminum disks, one disk on the top of the bag (*4*) and one disk on the bottom (*2*). The breathing bag is attached to these disks by means of rubber

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*Director, School of Anesthesia, University Hospitals of Cleveland.

1. Mautz, F. R.: A mechanical respirator as an adjunct to closed system anesthesia. Proc. Soc. Exper. Biol. & Med. **42**: 190-192, Oct. 1939.
2. Mautz, F. R.: Resuscitation in the operating room. J. Am. A. Nurse Anesthetists **8**: 13-18, Feb. 1940.
3. Mautz, F. R.: A mechanism for artificial pulmonary ventilation in the operating room. J. Thoracic Surg. **10**: 544-550, June 1941.
4. Mautz, F. R.; Beck, Claude S., and Chase, H. F.: Augmented and controlled breathing in transpleural operations. J. Thoracic Surg. **17**: 283-296, June 1948.
5. Shupp, M. G.: Mechanical control of breathing during transthoracic surgery. J.Am.A. Nurse Anesthetists **16**: 91-103, May 1948.

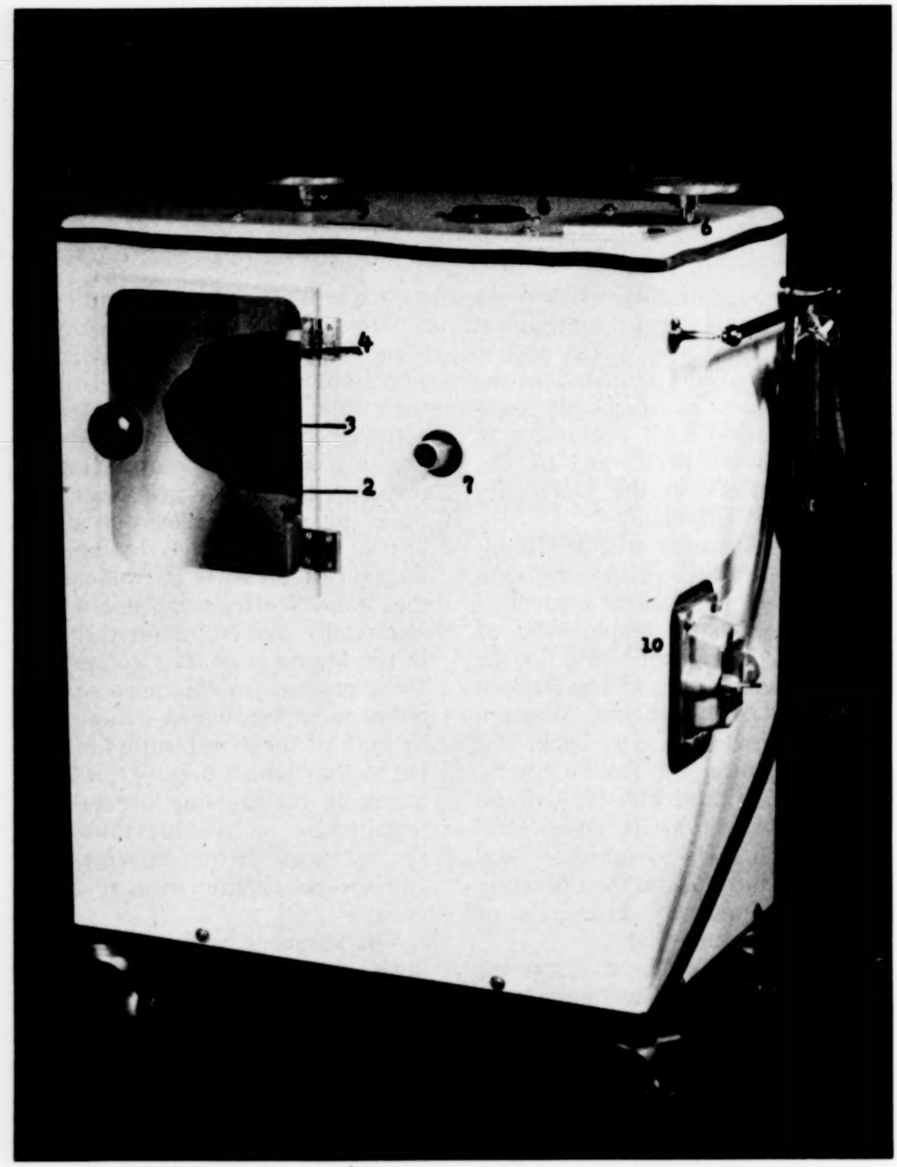

Fig. 1.—Exterior view of the Rand-Wolfe respirator: (*2*) movable aluminum disk; (*3*) rebreathing bag; (*4*) upper aluminum disk; (*5*) pressure control knob; (*6*) speed control knob; (*7*) respirator outlet; (*8*) pressure gage; (*10*) Off-On switch.

cuffs cemented to the bag. The motor pulley (*1*), driven by a belt, is connected to a shaft that rotates a cam (*9*), which in turn moves the lower disk up and down, compressing the breathing bag on the up stroke and releasing the pressure in the bag on the down stroke. This cam (*9*) is designed so that as it rotates there is a gradual increase of bag pressure to a peak, followed by a pause of approximately 25 per cent of the total time for one respiratory cycle, and then a sudden release. The cycling produced by the rotation of the cam simulates the inflation and deflation of the lungs in normal deep breathing. There may be a scarcely measurable amount of negative pressure developed as the lower disk drops down. The amount of positive pressure can be regulated as desired from 1 to 20 mm. Hg. This may be done either by varying the flow rate of the gases or by maintaining a constant flow rate of gases and adjusting the upper disk (*4*) with the "pressure control" knob (*5*), lowering it for increased pressure and raising it for decreased pressure. The machine can be set to cycle at a rate of fourteen to twenty-eight times per minute. The desired rate is set by turning the "speed control" knob (*6*), which increases or decreases the tension of the driving belt. A short rubber breathing tube is connected from the respirator outlet (*7*) to the soda lime canister of the anesthesia machine.

The management of the anesthesias in this series was similar to that already reported with the use of the Mautz respirator.[6] Ether or vinethene-ether by the open drop technic, with oxygen insufflated with catheter under the mask, was used for induction of anesthesia for all children; nitrous oxide and oxygen or pentothal sodium with nitrous oxide was used for induction for adults. A combination of ether, oxygen, and curare was used for maintenance of anesthesia. The carbon dioxide-absorption technic was used routinely, the circle type absorber being preferred for use for all adults and the majority of the children over 3 years of age. The intratracheal technic was used routinely.

The patients were allowed to breathe spontaneously until just prior to the opening of the pleural cavity, at which time, with the level of anesthesia at about midplane 2, the motor was turned on and the respirator connected to the soda lime canister. At the same time curare was administered intravenously to assist in establishing control of respiration. The mechanical control of breathing was then begun with the respirator set at from 7 to 10 mm. Hg bag pressure and the cycling rate at 16 to 24 per minute. By observing the operative field the lung inflation was adjusted so that optimal pulmonary ventilation was produced, with minimal interference with the work of the surgeon.

The anesthetic (ether) was administered intermittently to maintain the necessary degree of sensory depression, and curare was given in intermittent doses to maintain control of respiration. Rest periods and re-expansion of lung areas against which retractors or packs rested were carried out at intervals.

The use of the respirator was continued until the pleura was sealed. The respirator was then detached from the breathing circuit and the patient allowed to resume spontaneous breathing. In a number

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[6] Wolfe, K., and Rand, H. J., III: Electromechanical aids in resuscitation and anesthesia. To be published.

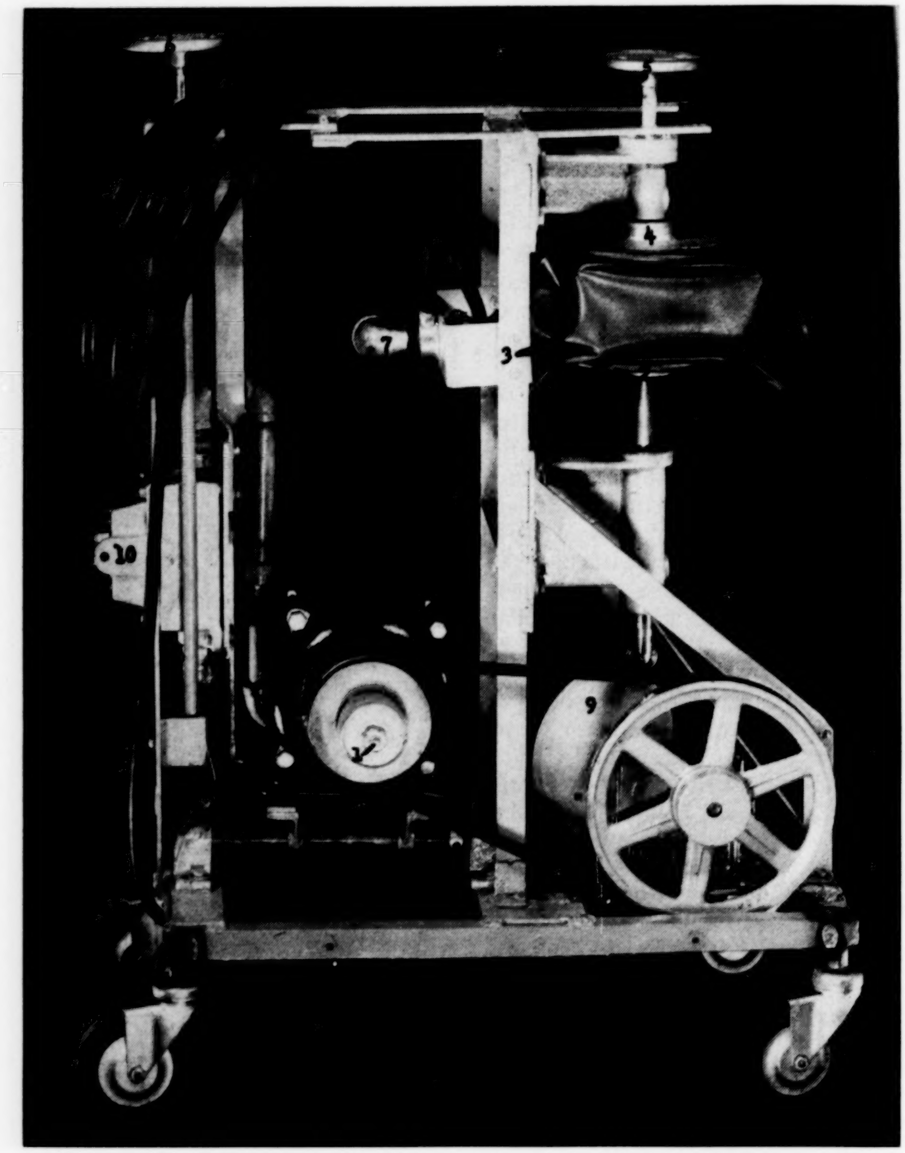

Fig. 2.—Interior mechanism of the Rand-Wolfe respirator: (*1*) motor pulley; (*2*) movable aluminum disk; (*3*) rebreathing bag; (*4*) upper aluminum disk; (*5*) pressure control knob; (*6*) speed control knob; (*7*) respirator outlet; (*9*) cam; (*10*) Off-On switch.

TABLE 1.—SUMMARY OF 40 CASES USING ETHER ANESTHESIA WITH CURARE AND MECHANICALLY CONTROLLED BREATHING

OPERATION	DIAGNOSIS	NO. CASES	AVERAGE AGE IN YEARS	AVERAGE TIME: ANESTHESIA HOURS	AVERAGE TIME: TIME ON RESPIRATOR HOURS	CURARE: AVERAGE DOSE IN CC.
Blalock or Potts anastomosis	Tetralogy of Fallot	13	7.4	5¼	3	2.7
Resection of narrowed aorta and anastomosis	Coarctation of aorta	10	15*	7	4-1/5	4.6
Section and suture of patent ductus	Patent ductus arteriosus	15	10	4	2	2.3
Pericardectomy	Compression scar on heart	1	51	6½	4	3.0
Exploratory thoracotomy	Probable pulmonary stenosis	1	19	3½	1¾	2.0

*One patient in this group was 44 years of age—one of the oldest patients on whom an anastomosis for a narrowed aorta has been done.

of cases slight respiratory activity was noted for a short period before the respirator was detached. In the remaining cases spontaneous breathing was resumed within one or two minutes after the use of the respirator was discontinued. In the cases in which respirations were inadequate, they were assisted manually until respiratory activity was satisfactory. Tracheobronchial suctioning was done routinely at the end of the operation. The chest was examined routinely for residual pneumothorax.

As pointed out in the previous article on mechanically controlled breathing,[5] there are several advantages in the use of the mechanical respirator in transthoracic procedures. The foremost advantage is that better pulmonary ventilation can be maintained. With manual assistance or control, rhythmic compression is interrupted when the anesthetist must free her hand from the bag occasionally for other duties and when her attention is distracted momentarily. These interruptions together with the fatigue factor in long procedures all interfere with the precision, and sometimes with the adequacy, of pulmonary ventilation. The surgeon can more readily synchronize his movements with the precise rate and amplitude of the pulmonic excursions. This is especially important when he is working with the heart and great vessels.[5]

RESULTS

The results in this first series of cardiac operations in which an electro-mechanical respirator was used are compiled in tables 1 and 2. With two exceptions (a thoracotomy and a pericardectomy) the surgical procedures consisted of resection and suture of patent ductus arteriosus, resection of narrowed aorta, and the Blalock or Potts operation for tetralogy of Fallot. The cases have been grouped according to the type of operation performed (see table 1).

---

[5] Shupp, M. G.: loc. cit.

The ages of the patients ranged from 8½ months to 51 years. Thirty-two were under 15 years of age. The anesthesia time ranged from two hours and five minutes to eleven hours and twenty minutes. The length of time the mechanical respirator was in use ranged from one hour and twenty minutes to seven hours and twenty minutes.

The smallest total amount of curare (Intocostrin) given to any one patient was 0.8 cc.; the largest total amount was 15.5 cc. The patient to whom the largest amount of curare was given was a 23 year old man who had coarctation of the aorta; this operation was the longest in the series. He was awake at the end of the procedure. His postoperative course was uncomplicated.

A sudden and/or marked slowing of the pulse rate during operation was encountered in several cases, but the administration of atropine intravenously brought the rate back to normal. No circulatory changes that might have been caused by the mechanical control of breathing were evidenced. With two exceptions, all patients regained consciousness while still in the operating room.

TABLE 2.—POSTOPERATIVE COMPLICATIONS AND DEATHS IN 40 CASES, USING ETHER ANESTHESIA AND CURARE AND MECHANICALLY CONTROLLED BREATHING

OPERATION	NO. CASES	DIAGNOSIS	DEATHS			OTHER COMPLICATIONS	
			NO.	CAUSE	POST-OPERATIVE DAY	TYPE	NO.
Blalock or Potts anastomosis	13	Tetralogy of Fallot	1	Not known definitely	1st	Left pleural effusion	3
						Left hydrothorax	1
						Pulmonary edema	3
Resection of narrowed aorta and anastomosis	10	Coarctation of aorta	0			Left pleural effusion	8
						Atelectasis	1
						Tension pneumothorax	1
						Minimal segmental atelectasis	1
Section and suture of patent ductus	13	Patent ductus arteriosus	0			Left pleural effusion	5
						Pulmonary edema	2
						Minimal segmental atelectasis	1
						Generalized convulsion (cause—?)	1
						Pulmonary infarction (?)	1
						Pulmonary congestion	1
Pericardectomy	1	Compression scar on heart	0			Atelectasis or pulmonary edema (?)	1
						Pleural effusion	
Exploratory thoracotomy	1	Probable pulmonary stenosis	0			Small hydrothorax	1

The postoperative complications in this series of anesthesias are compiled in table 2. The high incidence of pleural effusion was probably due to the fact that in all of these cases the pleura was closed without drainage. No postoperative laryngeal edema was observed in any of these patients, either infant or adult. The majority of these patients were discharged from the hospital approximately two weeks after operation.

There was one death in this series of forty patients, all of whom had serious operations on the heart or great vessels. The patient, who was considered a poor surgical risk, was a 21 year old man with tetralogy of Fallot, severe scoliosis and lordosis, and a reduced vital capacity of 70 per cent. The operative procedure was difficult and complicated and required ten hours. The patient died nineteen hours postoperatively, never having regained full consciousness. The postmortem examination revealed no significant pulmonary or brain damage.

SUMMARY

A review of forty cardiac operations under ether-oxygen anesthesia and curare and in which electro-mechanically controlled breathing was employed has been presented.* Thirty-two of the patients were under 15 years of age. All but two of these patients were awake at the end of the procedure. One death occurred in this series. The postoperative complications were few.

This technic of anesthesia for cardiac surgery has many distinct advantages and no disadvantages that we are aware of at present. Intratracheal intubation assures ready control of pulmonary ventilation and respiratory secretions. With the use of ether anesthesia and curare, respiration can easily be controlled, a minimal depth of anesthesia maintained, and rapid recovery from the anesthesia achieved.

This electro-mechanical respirator provides adequate oxygenation and elimination of carbon dioxide for the patient, optimal working conditions for the surgeon, and the elimination of the fatigue factor for the anesthetist.

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*A recent neurosurgical case with increased intracranial pressure in which the Rand-Wolfe respirator was used seems worthy of mention. The patient, a 14 year old boy, stopped breathing while being put into position on the operating table. The Rand-Wolfe respirator was immediately put into use and pulmonary ventilation maintained with mechanically controlled breathing for two and a half hours while a cyst was being removed from the third ventricle. Towards the end of the operation spontaneous respiration was resumed, and the use of the respirator was discontinued. This patient made a satisfactory recovery. There have been other instances in neurosurgery in which patients have been carried through long procedures with mechanical respiration. It is our belief that a mechanical respirator may be instrumental in the success of such operations.

CLINICAL OBSERVATIONS ON THE USE OF CURARE IN ANESTHESIA

Charlotte Turner, R.N., B.A.*
Cincinnati

When I was given the opportunity to speak to this group on the subject of curare, my immediate reaction was to be scared, and my delayed reaction was to feel I must make an exhaustive study of the literature on the subject so that I could present a highly scientific talk, which would probably have looked very learned on paper, but which would, without doubt, have been very boring to listen to. So, I concluded that, instead, I would present my clinical observations on the use of curare in anesthesia, with the hope that you would be interested, if for no other reason than to compare them with your own.

As graduate nurse anesthetists, we are all more or less familiar with the history of curare, its physiologic action, and its unquestioned value as a relaxant in conjunction with anesthetic agents. However, our dosages and methods of administration differ, depending on how we were taught and on what we have learned from experience.

At the Cincinnati General Hospital the patients to whom curare is to be given are chosen preoperatively on the basis of the operation to be performed and are those who, in our judgment, will tolerate it well. We do not condone its indiscriminate use to supplement inadequate anesthesia. We use either Intocostrin or *d*-tubocurarine chloride in most cases.

CURARE WITH CYCLOPROPANE

When the patient is to be anesthetized with cyclopropane, for either an upper or a lower abdominal operation, he is carried in the upper first plane of anesthesia, unless intratracheal intubation is to be done, until the skin incision is made. At this time, if he is not a poor risk patient, 100 units of curare is given intravenously. This dosage is reduced depending upon the age and condition of the patient. As soon as the curare has been given, the administration of cyclopropane is discontinued and oxygen given until normal respiratory excursions are assured. By this means we are certain that the plane of anesthesia is light, that any attendant respiratory depression is from the curare, and that we are not further depressing a patient who is already depressed from deep cyclopropane anesthesia. As soon as adequate respiratory exchange is established, the administration of cyclopropane is resumed, and the anesthesia maintained in upper second plane until the peritoneum is closed. Unless the procedure is unusually long or the patient extremely difficult to relax, this initial dose need not be supplemented. However, if the contrary is true, giving 20 to 40 units

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of curare before closure produces adequate relaxation without overly depressing the patient at the end of the procedure. When a period of apnea follows the initial dose of curare, intermittent positive pressure is used until the patient resumes respiration; then if his respirations are inadequate to maintain good pulmonary ventilation, a minimal amount of cyclopropane is used, and his respirations are reinforced by slight manual pressure on the breathing bag with each inspiration. If intubation is to be done, deeper anesthesia is required for induction, but curare is not administered until anesthesia has been lightened as much as is compatible with the maintenance of the tube in the trachea. Jerky respirations, accompanied by tracheal tug, which are sometimes seen following curare administration, are easily controlled by manually reinforcing each respiration, provided the patient has a perfectly clear airway as is assured in the case of intratracheal intubation. However, if intubation has not been done, and if at any time pulmonary ventilation seems inadequate, for the foregoing reason or for any other reason such as obstruction, an intratracheal tube is immediately inserted.

CURARE WITH ETHER

We do not consider it wise or necessary to use curare when ether is used as the anesthetic agent because of the curariform action of ether on muscle. However, there are patients in whom cyclopropane or pentothal sodium or spinal block anesthesia is contraindicated because of the cardiac status—notably in the aged, arteriosclerotic, hypertensive patient with impaired conductive mechanism—and in whom ether is the safest choice of anesthetic. Rather than to give such a patient enough ether for relaxation, we believe it advantageous to maintain anesthesia with enough ether to keep the patient asleep and to give a small dose of curare, 40 to 60 units, for relaxation. In this way we are able to maintain the blood pressure without pulse variations by carrying the patient in a light plane of anesthesia, getting a small amount of relaxation from ether, and supplementing it with doses of curare small enough to obviate depression. We have found that these patients do better postoperatively and recover much more quickly from anesthesia with less danger of postoperative pulmonary complications than when curare is not used.

CURARE WITH PENTOTHAL SODIUM

The pentothal sodium-curare combination is one which is not only pleasant for the patient but also popular with a good many anesthetists, some of whom believe that the two drugs are actually synergistic in their action. Some prefer to mix the two drugs in varying combinations, while others find it more advantageous to administer them separately. When we first started using the pentothal sodium-curare mixture, we used a combination of 1 Gm. pentothal sodium in 30 cc. distilled water plus 200 units (or 10 cc.) *d*-tubocurarine chloride to make a 2½ per cent solution. The holder that we use accommodates a 50 cc. syringe. Anesthesia was induced very slowly with this mixture to make sure that respirations were not depressed by too rapid administration. As soon as the lid reflex was abolished, the pupils centrally fixed, and the jaw relaxed, the patient received a 50-50 per cent mixture of nitrous oxide and oxygen on a semiclosed system. We prefer this mixture of nitrous oxide-oxygen because of the irritating effect of 100 per cent oxygen on the lungs. The use of the gas machine with the administration of pentothal sodium not only assures adequate oxygenation but also aids in judging depth of anesthesia by respiratory exchange in the breathing bag. If at any time during induction or thereafter respiratory obstruction occurred, a pharyngeal airway was carefully inserted, always with the danger of laryngospasm in mind should the anesthesia be too light for the patient to tolerate the airway. The difficulty that we encountered with this mixture of pentothal sodium and curare was this: The extremely apprehensive patient who had been given inadequate premedication, the chronic alcoholic patient, and the patient who had a high tolerance for barbiturates required large amounts of pentothal sodium to put them to sleep, and by the time they had received enough pentothal sodium, they had had enough curare to cause respiratory difficulties. The anesthesia was actually too light for operation, and the signs of anesthesia were sufficiently abolished by the curare for it to be extremely difficult to judge depth of anesthesia. So, at present, we use 1 Gm. pentothal sodium in 35 cc. distilled water with 100 units of *d*-tubocurarine chloride and find the mixture to be very satisfactory and the anesthesia much easier to control. Using this mixture, we find that we see less change in blood pressure, pulse, and respirations and that it is less difficult to maintain the proper level of anesthesia with adequate relaxation.

The pentothal sodium-curare mixture is also used when intratracheal intubation is performed, although in a slightly different combination. This method of intubation is especially indicated in patients on whom it is inadvisable, or impossible, to put a face mask, such as those with burns and lacerations of the face, those on whom it is difficult to keep a closed system, e.g., when a Levin tube is in place, and those with severe hypertension who do not tolerate any period of excitement or coughing. For this procedure we usually use ½ Gm. pentothal sodium in 17 to 18 cc. distilled water, with 40 to 60 units of curare. Should the patient require more than this amount in preparation for intubation, we supplement with 2½ per cent pentothal sodium solution without the addition of more curare to obviate respiratory depression. Anesthesia is induced very slowly, 4 to 5 cc. of the mixture being given as an initial dose. More is added as needed, not exceeding 3 cc. at a time, until the lid reflex is abolished, the pupils centrally fixed, and the jaw relaxed, additional drug never being given until adequate respiratory exchange is assured. When the anesthesia is sufficiently deep, a pharyngeal airway is cautiously inserted, not primarily for relief of obstruction but as a test for the presence or absence of pharyngeal and cough reflexes. Should the patient cough when the airway is inserted, it is immediately removed, and anesthesia is deepened until the airway is tolerated. Beyond this point, usually about 5-6 cc. more solution is sufficient for intubation. Should coughing occur when the glottis is stimulated by the laryngoscope, anesthesia is deepened until intubation can be performed without reaction by the patient, the goal at all times being to maintain adequate pulmonary ventilation while abolishing laryngeal reflexes. When the intratracheal tube is in place, it is attached to the gas machine and further anesthesia instituted by the agent of choice for the procedure. This procedure can also be accomplished by induction of anesthesia to the proper plane with 2½ per cent pentothal sodium solution alone, with the addition of 40 units of curare in one dose immediately before the actual intubation, if it is needed to abolish reflexes. In this way one can frequently get by without having to use curare at all, which we believe is advantageous to the patient with reduced vital capacity.

CURARE FOR CHILDREN

Regarding the use of curare in pediatric anesthesia, there has always been some conjecture. At the Children's Hospital, Cincinnati, there is no hard and fast rule regarding its use; however, we do not believe it is advisable to use curare at all on children under age 7. To children age 7 to 12 or 14 years, depending on their size and physical condition, curare is given, but by the intramuscular rather than the intravenous route. When it is given intramuscularly, the severity of its action is lessened, and its maximal effect is attained in about twenty minutes. Usually no more than 60 units is given, care being taken to respect the time element so that relaxation will be at its maximum when it is needed. In the group over 12 to 14 years of age intravenous injection is used, the dose being determined by the size and condition of the patient in a manner similar to that used for the adult.

CURARE AND REGIONAL ANESTHESIA

We do not recommend the use of curare to produce relaxation in conjunction with local infiltration anesthesia or to supplement spinal block anesthesia that has worn off to the extent that relaxation is not adequate. We believe that doses of curare sufficient to produce relaxation in a patient who is awake cause such unpleasant subjective sensations that its use is inadvisable, since the restlessness and respiratory embarrassment that ensue counteract the relaxation that might be obtained.

METUBINE IODIDE AND SYNCURINE

Until now I have been talking about the curare preparations Intocostrin and *d*-tubocurarine chloride. However, two relatively new preparations that we have used are worthy of mention. One is "Metubine Iodide," which is a preparation of curare, and the other is "Syncurine," which is a synthetic curare-like drug.

Metubine Iodide is available in 10 cc. vials, in a sterile aqueous solution, each cubic centimeter of which contains 0.5 mg. active curare in comparison with the 3 mg. per cubic centimeter in Intocostrin and *d*-tubocurarine chloride. All three preparations, however, are adjusted to 20 head drop units per cubic centimeter. Metubine Iodide also has the same physiologic action on the myoneural junction without action on the central nervous system. The volume dosage of Metubine Iodide, however, is slightly higher, but the total amount of active curare needed for relaxation is less. Our experience with it has been confined to its use in conjunction with cyclopropane, and we have found 6 cc. Metubine Iodide, which would contain 3 mg. active curare, to approximate 4 cc. Intocostrin, which contains 12 mg. active curare. Relaxation with this amount was found to be fair, with no respiratory depression or change in blood pressure or pulse rate and volume. Our experience with Metubine Iodide has not been extensive enough for me to feel qualified to evaluate it authoritatively. Its manufacturers claim the following advantages:

1. Amount of anesthetic agent required to accomplish complete relaxation is reduced.
2. Recovery is more rapid.
3. Activity is more prompt, pronounced, and selective, weight for weight, than of any other marketed curare compound.
4. Smaller amounts of curare reduce side effects.
5. In therapeutic doses it produces no appreciable change in blood pressure, cardiac rate, or body economy with no effect on the central nervous system.
6. It does not produce spasm of the bronchial musculature.

Syncurine is a synthetic curare-like product, containing the active principle decamethonium bromide, which is commonly known as C10. It is an aqueous, stable, nonirritating solution that is compatible with both procaine and pentothal sodium and produces skeletal muscle relaxation when given intravenously. Compared with curare, it is claimed to be shorter acting, reducing the possibility of prolonged respiratory depression, accumulated effect, decrease in blood pressure, and bronchospasm. Unlike curare, the only antidote for overdosage of Syncurine is controlled artificial respiration, as its action is not affected by prostigmine. Also it is claimed to be compatible with all anesthetic agents, including ether, without reduction of dosage. From 1 to 1¼ cc. of Syncurine at the rate of ½ cc. per minute intravenously is the optimal initial dose recommended and produces complete relaxation in from two to four minutes. The initial dose may be supplemented with ¼ to ½ cc. at ten to thirty minute intervals, as required. After thirty to forty minutes full relaxing doses of 1 to 1¼ cc. may usually be given without danger of cumulative effect. Because of the relatively short duration of action, ½ to 1 cc. may be given for closure with the assurance that adequate spontaneous respiration will be present at the end of the procedure.

We can only report our findings in the following cases:

CASE 1.—The patient was anesthetized for a Wertheim procedure with cyclopropane given intratracheally. An initial dose of 1 cc. (or 2 mg.) Syncurine was given five minutes before the skin incision was made. Because of the expected length of the procedure and the need for profound relaxation, another 1 cc. of Syncurine was given in ten minutes. This resulted in good relaxation but was followed by marked respiratory depression lasting fifteen minutes, which was remedied by reinforcement of respirations until normal respiratory volume was resumed. The procedure lasted for four and a half hours without the need for giving any more of the drug.

CASE 2.—A young obese muscular man was anesthetized with cyclopropane for appendectomy. Much difficulty was encountered surgically in this procedure, so that both a McBurney and a midline incision were made. Because of this, and the fact that the patient was a big and muscular individual, 1½ cc. Syncurine was given as an initial dose. This was followed by adequate relaxation but also by a period of apnea lasting for five minutes, during which time positive pressure was given until the patient resumed spontaneous respirations. No additional dosage of the drug was needed for closure.

CASE 3.—The patient was to undergo closure of a colostomy under pentothal sodium anesthesia. The patient was put to sleep in the usual manner with 2½ per cent pentothal sodium and 1 cc. Syncurine, given into the intravenous tubing, when the skin incision was made. Adequate relaxation was obtained, and no respiratory changes were encountered. No untoward blood pressure or pulse variations were evident in any of these cases.

Syncurine, like curare, achieves relaxation physiologically by the blocking of impulses at the myoneural junctions. However, unlike

(*Continued on page* 43)

ANESTHESIA FOR PROLONGED SURGERY

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Surgical procedures requiring profound and prolonged relaxation present a problem to the anesthetist. Adequate relaxation is necessary to aid the surgeon in his work but should not hinder the patient's chances for a rapid uneventful recovery. Deep anesthesia increases the incidence of pulmonary complications and circulatory failure. The trauma inflicted by prolonged manipulation inside the abdomen also increases the likelihood of complications.

Since the advent of curare, postoperative shock has been greatly reduced. Curare blocks the transmission of nerve impulses at the nerve axon ending in skeletal muscle. Curare does not prevent the formation of acetylcholine, a chemical substance supposedly associated with neural transmission, at the motor nerve ends, but it does antagonize completely the action of small amounts of acetylcholine on muscle responses.[1] By blocking nerve impulses to muscles, it raises the threshold to pain. With the use of curare, it is possible to obtain relaxation equal to that produced by spinal anesthesia without administering high concentrations of toxic anesthetic agents, and as a result circulatory disturbances are lessened.

Anesthesia for Sympathectomy

Sympathectomy operations last from three to five hours. For induction of anesthesia 2.5 per cent pentothal sodium is used. The initial dose of 0.5 Gm. pentothal sodium contains 100 units of *d*-tubocurarine. When sufficient relaxation of the masseter muscle has been obtained, oral intubation is performed using a Magill catheter with cuff that has been well lubricated with 2 per cent pontocaine jelly. Sometimes it is necessary to give 20-40 additional units of curare in order to obtain relaxation and permit easy nontraumatic intubation. Sometimes respiratory depression follows the induction when this amount of pentothal sodium and curare is used. When given rapidly, pentothal sodium tends to produce severe respiratory depression, but this depression has been observed to be transitory and is easily overcome. Within three or four minutes the anesthesia becomes stabilized and satisfactory respirations are established.[2] For maintenance of anesthesia, a 50-50 per cent mixture of nitrous oxide and oxygen is used, an occasional 1 cc. of pentothal sodium being given as necessary. If the patient seems to require more than 1 Gm. pentothal sodium, a small amount of ether or cyclopropane is added to the mixture. Too

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Read before the Western States Assembly of Nurse Anesthetists, San Francisco, May 10, 1949.

[1] Blubaugh, L. U., and Linegar, C. R.: Curare and modern medicine. Economic Botany 2:73-82, Jan.-March 1948.

[2] Karblau, Aaron H.: Curare as an adjunct in pentothal-nitrous anesthesia. Anesth. & Analg. 27:242, Sept.-Oct. 1948.

high a percentage of oxygen not only unduly increases the risk of explosion but in long procedures produces a nonphysiologic atmosphere from which the patient may have difficulty in adapting himself in the immediate postoperative period, with resultant collapse.[3]

We give 500-1,000 cc. blood to replace the blood lost and about 1,000 cc. of 5 per cent glucose in distilled water intravenously. Neosynephrin, 5 minims (1.67 mg.) of a 1 per cent solution, is added to the last 500 cc. of fluid in the flask for slow administration, which is continued after the patient leaves the operating room. Neosynephrin is a sympathomimetic drug and acts upon the cardiovascular system to produce an increase in blood pressure through peripheral vasoconstriction and an increase in stroke volume output to the heart.[4] If a severe decrease in blood pressure is permitted, thrombosis may occur, and if a severe increase is produced, cerebral accident may ensue. Blood pressure and pulse rate are checked frequently during the first twenty-four hours postoperatively. By maintaining the patient in a light plane of anesthesia during the operation, it is possible to have him fairly wide awake when he leaves the operating room. Light planes of anesthesia do not interfere greatly with the patient's normal vasomotor tone, which is a necessary compensating factor when blood loss is severe and helps prevent postanesthesia depression.

ANESTHESIA FOR RADICAL MASTECTOMY

In performing radical mastectomy, one of our surgeons requires anesthesia lasting seven to eight hours. The operation is a long and tedious procedure for both surgeon and anesthetist. The anesthesia of choice consists of induction with pentothal sodium and maintenance with nitrous oxide and oxygen, curare being used to obtain relaxation. One reason for this choice is that the cautery is used for a short time. A 2.5 per cent solution of pentothal sodium is used for induction, with 100 units of concentrated *d*-tubocurarine in the first 20 cc. Some anesthetists use the continuous drip method, but I believe that anesthesia is smoother with the administration of a 2.5 per cent solution. This method is more flexible and more easily controlled and requires less attention to detail. For maintenance a 50-50 per cent mixture of nitrous oxide and oxygen is employed. About 20 units of curare is given each hour. The time of administration is not determined by the clock but by the signs of lessening effect. The value of the simultaneous administration of nitrous oxide and pentothal sodium is apparent. Barton, Wicks and Livingstone[5] discovered in studies on dogs and patients that the amount of pentothal sodium required to maintain a plane of anesthesia when a 50-50 per cent mixture of nitrous oxide and oxygen was also used was only one fourth the amount required when pentothal sodium was used alone or with oxygen. This type of combined anesthesia produces a definite increase in arterial blood oxygen values and may make all the difference between mild anoxia and a normal state. There may be serious consequences when the oxygen-carrying mechanism is below normal.

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[3] Stephen, C. R., and Pasquet, A.: Anesthesia for neurosurgical procedures. Anesth. & Analg. **28**:80-81, March-April 1949.

[4] Thomas, G. J., and Sica, P. A.: Neosynephrin hydrochloride in anesthesia and shock. Anesth. & Analg. **27**:101-110, March-April 1948.

[5] Barton, G. D.; Wicks, W. R., and Livingstone, H. M.: Effect of pentothal on arterial blood gases. Anesthesiology **5**:517, Sept. 1946.

The results of adding curare to the pentothal sodium solution have been promising. There is no doubt that the combination permits considerable reduction in the amount of pentothal sodium used. Over a seven or eight hour period a total of 1.0 to 1.25 Gm. pentothal sodium is used and approximately 220 to 240 units of curare. For blood loss 1,000-2,000 cc. of whole blood and 1,000 cc. of 5 per cent glucose in distilled water may be given intravenously. For administration during the last hour of anesthesia, 5 minims of 1 per cent neosynephrin (1.67 mg.) is added to the glucose solution in the flask.

The period of postoperative narcosis in these cases is minimal. Without exception, every patient responded while the dressing was applied. It is gratifying to have a patient talk and ask if the operation is over. Patients undergoing radical mastectomy have muscular weakness that makes good nursing care with frequent changes of position imperative.

ANESTHESIA FOR ABDOMINAL SURGERY

For abdominal operations, such as gastrectomy, Wertheim panhysterectomy, and removal of the stomach, spleen, pancreas, and part of the esophagus and diaphragm, the anesthesia used is the same as that described, with the exception that occasionally a small amount of ether (about 10 cc.) or cyclopropane is added. One of the main objections to the use of cyclopropane is the occurrence of cardiac irregularities and of so-called "cyclopropane shock" postoperatively. It has the advantage of permitting the administration of high concentrations of oxygen, but it increases cardiac output and blood flow. It sometimes severely increases arterial pressure, an effect thought to be due to the presence of carbonic acid, and it also favors hemorrhage by producing capillary dilatation. When we have used cyclopropane, we have successfully avoided postoperative cyclopropane shock by changing the anesthetic mixture to nitrous oxide and oxygen during the last thirty minutes of the operation. According to Dripps,[6] the virtue of this method may lie in the gradual lowering of the oxygen concentration or in the more gradual reduction of arterial carbon dioxide tensions than that accomplished by the sudden removal of the mask at the end of cyclopropane anesthesia. He presented evidence to suggest that this hypotension is partly related to an abnormally high level of carbon dioxide in the arterial blood during anesthesia. The increase in arterial carbon dioxide tension results from the depressant action of cyclopropane on respiration. With increasing respiratory efficiency in the immediate postoperative period, respiratory acidosis is corrected, and blood pressure decreases as the stimulant action of carbon dioxide is removed.

SUMMARY

We believe that our success in satisfying our surgeons has been due to light anesthesia with good relaxation. They have been impressed with the postoperative course of their patients. Postoperative shock and depression have been minimized, and the postoperative course has been more satisfactory than when deep anesthesia was used in the past. Relaxation

(*Continued on page* 60)

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[6] Dripps, R. D.: Immediate decrease in blood pressure. Anesthesiology **8**:33-34, Jan. 1947.

EXPLOSION HAZARDS IN OPERATING AND DELIVERY ROOMS

**George J. Thomas, M.D.*
Pittsburgh**

Tragedies from fires and explosions have occurred in operating and delivery rooms for as long as flammable anesthetic agents have been used. It is true that such accidents occur once in approximately 100,000 anesthesias. However, definite hazards are present in places where flammable anesthetic agents are used; therefore, definite precautions must be taken to avoid or, at least, further minimize these catastrophes.

TERMINOLOGY

At this time, I would like to clarify the terminology used in designating volatile anesthetic agents. I would like to suggest the adoption of the words flammable for inflammable and nonflammable for noninflammable, because I believe this terminology is less confusing to everyone.

FACTORS CONDUCIVE TO EXPLOSIONS[1]

The four essential factors required for the development of an explosion are:

1. Combustible gases or vapors.—These may be in the form of gases, liquids, or solids. In ordinary anesthesia practice these gases or vapors are ethylene, cyclopropane, diethyl ether, and divinyl ether, or a combination of these. We must not exclude the nitrous oxide-oxygen-ether sequence, because this mixture is also flammable.

2. Oxygen supply.—Oxygen is essential to all ordinary combustion. In anesthesia oxygen is supplied pure, in air, or in chemical combination with nitrogen in nitrous oxide.

3. Explosive mixture ratio of 1 and 2 above.—Explosive mixtures are those in which the ratio of flammable gases and oxygen is within certain limits. These limits are shown in the table. Flames instead of explosions may occur when the ratios are outside of these limits.

4. Ignition source.—Such mixtures require an ignition source for an explosion to occur. Ignition sources may be small flames, incandescent surfaces, local combustion initiated by catalysts, and electric sparks.

Factors 1, 2, and 3 are essential to practical anesthesia. However, the fourth factor mentioned (the ignition source) is not essential and should be controlled or eliminated.

Open flames, such as those provided by alcohol lamps, Bunsen burners, matches, and smoking, should definitely be prohibited in

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Read before the Maryland, District of Columbia, Delaware Hospital Association, Wilmington, Del., November 14, 1949.

*Director, Department of Anesthesiology, University of Pittsburgh School of Medicine, St. Francis Hospital, and Medical Center hospitals.

[1] Jones, G. W.; Kennedy, R. E., and Thomas, G. J.: Technical paper 653, United States Bureau of Mines.

LIMITS OF FLAMMABILITY OF ANESTHETICS[1]

ANESTHETIC AGENTS	DENSITY OF AIR TAKEN AS 1	LIMITS OF FLAMMABILITY					
		IN AIR		IN OXYGEN		IN NITROUS OXIDE	
		Low	Up	Low	Up	Low	Up
Ethylene	0.97	3.05	28.6	2.90	79.9	1.90	40.2
Propylene	1.45	2.00*	11.1	2.10	52.8	1.45	28.8
Cyclopropane	1.45	2.40	10.3	2.48	60.0	1.60	30.3
Ethyl chloride	2.23	4.00	14.8	4.05	67.2	2.10	32.8
Ether-divinyl	2.42	1.70*	27.0*	1.85	85.5	1.40	24.8
Ether-diethyl	2.56	1.85*	36.5*	2.10	82.0	1.50	24.2
Nitrous oxide	1.52	Not flammable		Not flammable		Not flammable	
Chloroform	4.12	Not flammable		Not flammable		Not flammable	

*Tests made in 8 liter, cylindrical, closed steel bomb.

operating rooms and in other rooms where anesthetics are administered or where anesthetics may be present.

The use of incandescent or high frequency cauteries or coagulators within a distance of two feet from the mouth of a patient receiving flammable anesthetics should be prohibited unless rubber sheet and wet drapes are properly applied.

On rare occasions, explosions of ether (from peroxides) have occurred owing to the effect of sunlight. Ether should always be stored in original cans or dark glass bottles. Unless amber glass jars are supplied by the manufacturers, any ether remaining in the anesthesia machine should be removed and properly stored at the end of the day's work.

Electrical equipment should be inspected frequently to detect faulty operation, broken switches and plugs, frayed cords, and open sparks. Unless the equipment is explosion proof, it should not be used where concentration of flammable anesthetic gases may be present.

Roentgen ray and fluoroscopic equipment can cause fire or explosion when flammable anesthetic agents are being used. Roentgen ray apparatus is often brought into the operating room during the administration of an anesthetic agent. However, the shockproof equipment decreases the hazard of fire and explosion but does not eliminate it entirely.

STATIC ELECTRICITY

Static electricity is the cause of a high percentage of explosions in hospitals. Static electricity is electricity at rest. It is the type of electricity that results from friction and is deposited upon physical objects.

Friction between dissimilar, nonconductive materials will produce a static discharge. Some examples of this are the shuffling of feet across a rug on a dry day, running a comb through the hair, rubbing a glass rod with silk or woolen cloth, or separating blankets in unfolding them. Static charges can be generated between silk or rayon and other nonconductive materials. Static charges can also accumulate on articles that are near electrically charged objects.

Most materials permit a passage of electricity through them, but some materials are such poor conductors that they are considered insulators. Articles vary in the extent of their conductivity of electric charges. Metals and carbon are good conductors, whereas acids, salt solutions, plants, and animals are partial conductors. Various oils, dry wood, silk, rubber, plastics, glass, and dry air are considered insulators.

It is almost impossible to prevent electrostatic charges in operating rooms. There is so much activity that friction is produced by contact with nonconductive materials that are present in the room, and charges are generated.

The only means to prevent the accumulation of static charges is to provide paths by which the electrostatic charges flow away as fast as they are generated. I am referring to an efficient conductive floor and efficient conductive contact thereto. All movable objects present in a room where flammable anesthetic agents are administered should have proper grounding with the floor.

Grounding

Grounding chains are useful for removing static electricity from operating room equipment only if the following conditions are observed:

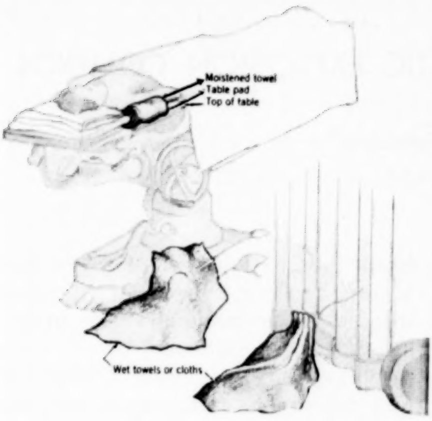
1. The floors must be definitely conductive or have metal dividing strips closely spaced.

2. The chains should make long line contact with the floor if the floor is conductive, or with at least two metal strips if it is not. Chains that are so short as to provide only one or a few links in contact with the floor cannot be relied upon to remove static. Long chains on tables, stools, carriages, gas machines, etc., will not be in the way if they are placed diagonally underneath the equipment. To insure greatest benefit, two diagonal chains should be employed on each piece of equipment.

3. Chains should be cleaned occasionally to remove dirt, wax, grease, soap, oxide films, or other foreign substances that may accumulate between the links and cause high resistance. This should be done with a stiff brush and a greaseless detergent.

4. Chains having open links are to be preferred to those of the ball type, which have conductive parts that are inaccessible for cleaning. They should be of material that will not rust or give off abrasive sparks when dragged over concrete or other hard surfaces. However, beaded chains are not desirable because they have high electrical resistivity.

In the event the floor has also high resistance, a satisfactory solution to the problem has been found in the use of one moistened and two wet towels (or any other sizeable pieces of fabric). The first towel is moistened and folded lengthwise; one end is placed under the patient's shoulder (against the bare skin), and the other end is tucked between the mattress and the top of the operating table. A second towel is wet and laid from the base of the table (above the caster) to the floor toward the anesthetist's foot. A third towel is also wet and is stretched from the foot of the gas machine to the floor. The anesthetist's foot touches either the towel connected with the base of the operating table or the one that is in contact with the foot of the gas machine. Moistened and wet towels employed in such a manner will provide excellent conductors and grounding even though a standard test may indicate high floor resistance (figure). The explanation for this recommendation is as follows:



Conduction of electricity to ground through a floor is accomplished through many paths of high resistance. When a contact to the floor is made with a chair, plate, or a chain, only a few of the available paths to ground are used. When contact is made through a wet towel, cloth, or pool of water placed on a floor, thousands of such paths are made available, and the electricity finds free access to earth.

CONDUCTIVE FLOORS

The floor is usually the only path for electrical charges to follow. If the floor is nonconductive, there is no path available to equalize these charges. Floors made of rubber, linoleum, porcelain tile, or marble are poor electrostatic conductors.

A terrazzo floor with conductive metal screening may be sufficiently conductive. Experiments show that floors made from magnesium oxychloride and finely divided metallic copper have low electrical resistance and are more desirable.

HUMIDITY

It is believed by many anesthetists that an atmosphere of high humidity will prevent the accumulation of static electricity and thereby eliminate explosions caused by electrostatic charges. However, several explosions have been reported with the relative humidity at 65 per cent; recently an explosion was initiated by a static spark when the relative humidity was 76 per cent.

During warm sultry days air-conditioned operating rooms are certainly desirable. However, it is believed by some authorities that artificially conditioned operating rooms are more dangerous than nonconditioned ones, owing to the removal of carbon dioxide from the air by some machines. These authorities believe that it is the carbon dioxide in the humid atmosphere that makes it conductive.

While this seems plausible, it is not altogether true, because most chargeable surfaces in operating rooms are contaminated with dust, soap films, etc., which probably furnish more ions in solution than would be furnished by the carbon dioxide.

Finally, we must not forget that there is no substitute for good conductive floors and connections thereto.

THINGS TO REMEMBER

1. Do not cover anesthetic appliances when not in use.
2. Avoid wool, silk, nylon, nonconductive rubber, fabrics such as shark-skin, "plastics," etc., in places where anesthetics are administered or stored.
3. Keep visitors and personnel away from the anesthetist and his appliances.
4. Beware of gas or vapor leak.
5. Moving anesthetic appliances is always dangerous. Use extreme caution.
6. Connecting or disconnecting masks, tubes, breathing bags, etc., is a source of static energy.
7. Conductive leather-soled shoes should be worn by all operating room personnel.
8. Operating and delivery room floors should be conductive.

(*Continued on page* 34)

STANDARDS FOR ANESTHETIC EXPLOSION CONTROL

Roy Hudenburg*
Chicago

A reasonable program of safeguards against explosions of combustible anesthetics has been established as a national standard by the National Fire Protection Association. The standard, "Recommended Safe Practice for Hospital Operating Rooms," also adopted by the National Board of Fire Underwriters, was developed by the National Fire Protection Association's Committee on Hospital Operating Rooms, a subcommittee of the Committee on Gases. This standard replaces an advisory pamphlet, published in 1944, that did not meet with general acceptance by hospitals, presumably because of restrictive requirements.

The new standard specifies that the zone of hazard in the anesthetizing location extends to a point five feet above the floor. Permanent electrical installations above the five foot line may be of ordinary wiring and may employ ordinary appliances, as long as the materials and installations are in accordance with the provisions of the national electrical code for ordinary locations.

Ventilation has no bearing on this zone of hazard. Under the old recommendation, an operating room not provided with mechanical ventilation was considered to be a hazardous area throughout and, if ventilated according to certain standards, was considered to be hazardous to a height of seven feet above the floor. In either case this usually made necessary the installation of an explosion-proof, ceiling-hung surgical light. Under the new provisions, this major surgical lighting may be of ordinary design, provided any switch that is a part of, or attached to, the fixture is of explosion-proof design. The Committee's recommendation, however, is that the major light be controlled from a wall switch, preferably located above the five foot level.

It is particularly important to note that all portable electrical apparatus intended for use in the hospital operating room is to be of explosion-proof design. This requirement is based on the premise that any portable electrical apparatus may be brought into the zone of hazard near the gas machine in which explosive concentrations of gases are to be found. This requirement should particularly be noted by administrators and architects who are responsible for the specification of such equipment, anesthetists and surgical supervisors who are concerned with the operation of such equipment, and hospital engineers who maintain and inspect this kind of equipment.

Because static electricity appears to be the major offender in ignition of gases resulting in explosions frequently fatal to the patient, the new standard lays heavy emphasis on a complete system for the elimination of static in anesthetiz-

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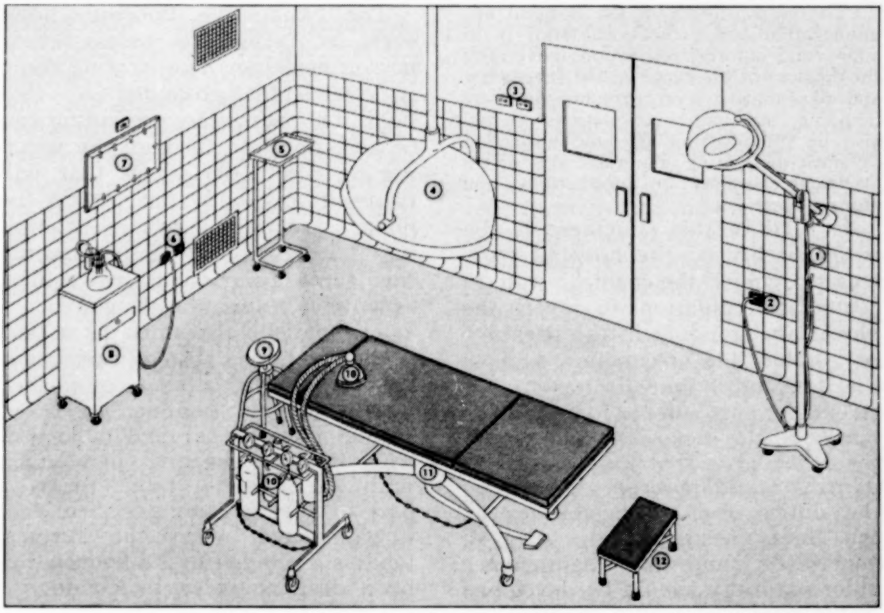
*Secretary, Council on Hospital Planning and Plant Operation, American Hospital Association.



Courtesy HOSPITALS, Journal of the American Hospital Association.

OPERATING ROOMS under the new standards will include safety devices as illustrated in this artist's drawing (tiling indicates the five-foot level). Numbered items are: (1) Portable surgical lamp—grounded through conductive rubber casters. (2) Explosion-proof outlet—below the five-foot level. (3) Push-button switches—need not be explosion proof since they are above five-foot level. (4) Ceiling-hung operating room light—explosion-proof construction is no longer required except for outlets or switches incorporated into the construction. (5) Instrument stand—grounded through conductive-rubber casters. (6) Pair of explosion-proof outlets. (7) Recessed x-ray view window with electrical connections outside of operating room; toggle switch to operate is above the five-foot level and need not be explosion proof. (8) Suction apparatus—grounded by conductive rubber casters; motor within the cabinet must be explosion proof. (9) Anesthetist's stool—grounded through conductive rubber tips; seat must be unpainted, and if a pad is used it must be covered with conductive rubber. (10) Anesthesia apparatus—mask and hose of conductive rubber; this unit is grounded by a drag chain but the same purpose would be met if casters were of conductive rubber. (11) Operating table—the pad is of conductive rubber; table is grounded to floor by a drag chain. (12) Surgeon's metal footstool—has conductive rubber tips, and padding, if used, must be of conductive rubber. The floor must be constructed of conductive materials.

ing locations. This system utilizes a conductive floor in the anesthetizing location and the adjoining corridors as the medium through which static charges on the bodies of all persons and all equipment in the room are equalized and carried to ground. When static charges are carried off as rapidly as they are made, there is no danger of a tiny spark, which is all that is necessary to set off explosive gaseous mixtures.

While the standard deals in detail with the physical provisions for explosion safeguards, it also develops at length the responsibilities of hospital officials in policy-making, administrative, and supervisory capacities. It says specifically (par. 7-2 [a]):

"The responsibility of the hospital administration and professional staff is to adopt, and enforce, regulations governing the conduct of the surgeon, the anesthetist and all operating room personnel in anesthetizing locations. Regulations should also be provided for periodic inspection of static-dissipating materials and of all electrical equipment in anesthetizing and storage locations."

Implied in this statement is the responsibility of the hospital trustees to require the medical staff to formulate regulations to govern the physicians' conduct in the presence of combustible anesthetics, and of the hospital administrator to instruct the personnel involved in the nature of the explosion hazards and the safeguards that must be maintained. Standing orders governing the duties and responsibilities of the chief anesthetist, the surgical supervisor, and the maintenance chief naturally should be developed in the course of such a program.

In many technics nonobservance by one individual may merely weaken the structure of protection; however, in carrying out this program, particularly those phases having to do with static, a break in the chain is apt to create a greater hazard than if no safeguards were undertaken at all.

In the section of the standard dealing with construction and equipment, it is required that the flooring of anesthetizing locations, storage locations, and surgical corridors must have all-over conductivity, but with sufficient resistance to prevent electrical shock in the event that contact is made with an exposed wire. This means that whenever such a floor is tested during its life, its average resistance must be more than 25,000 ohms but less than 500,000 ohms. These resistance limits protect against shock and yet permit static to be drained away before it can jump a spark-gap to set off an explosion.

The conductive flooring, however, is ineffective unless every person entering the operating room is electrically grounded to that floor. This personnel grounding can be accomplished through the wearing of conductive shoes that will transmit any body charges to the floor. Any other personnel grounding device capable of performing this same function is, of course, acceptable under the standard.

The patient also must be a part of the grounded system, and under the standard this is accomplished by the use of conductive rubber sheeting on the surgical table pad. This rubber sheeting in contact with the metallic table forms a part of the grounding system that is completed when the surgical table is grounded to the floor, either by a drag chain or by conductive casters.

The anesthetist, who performs her duties in the midst of the hazardous area, under the standard is provided with a three way chain of static dissipation to the floor. The most direct path to ground is provided by the conductive shoes that will become, presumably, as standard a part of the hospital garb as the face mask or the surgeon's gloves. The secondary path of static discharge is through the anesthetist's stool. This must be grounded to the floor, either by conductive rubber tips or by a drag chain. It must be of metallic construction and must have on its seat no covering or finish that will impede the path of electricity. This provision obviously precludes the use of rubber pads but would permit the use of a pad providing it is covered with conductive rubber sheeting, both top and bottom, thus forming a continuous electrical path to the floor. The third path of static electrical discharge will be through the anesthesia machine itself, independent of the anesthetist's habitual contact with the patient. The anesthesia machine will be grounded to the floor by either conductive casters or a drag chain and will be grounded to the patient through the use of conductive rubber fittings. At least one surgical supply house has recently announced the availability of a complete line of conductive rubber fittings including the face mask. Heretofore, technologic difficulties prevented the manufacture and marketing of such materials.

The standard reaffirms the known prohibition of the use of all nonconductive textiles in the operating room. This includes wool in the form of blankets or wearing apparel, so that even visiting surgeons will be required to change from their street clothes into cotton hospital garb. Nylon, rayon, shark skin, silks, and similar materials are prohibited, for example, in uniforms and hosiery. With respect to hosiery, the main objection is that any silk or synthetic textile in the sole of the sock will insulate the foot from the conductive shoe and impede the path of static discharge.

One other item of particular interest to the anesthetist is contained in the appendix material. This is a statement to the effect that the Committee on Hospital Operating Rooms recognized the possibility that an explosion might result from the detonation of ether peroxides formed by the oxidation of ether over a period of time. While this possibility is, in effect, only a theory and has not been verified in the laboratory, it does indicate that the ether bottle of the machine should be completely emptied before being refilled, and that both the bottle and the ether evaporator should be cleansed (outside the operating room) as a precautionary measure.

As another protection against electrical shock, these standards recommend that operating room circuits should be of a type known as an ungrounded circuit, which is fed through an insulating transformer rather than in the conventional direct manner. When such circuits are installed, they will be equipped with a signal system that will indicate when such circuits become susceptible to the giving of electrical shock by virtue of a ground in the electrical system. When this circuit operates normally, the signal system will show a green light, but when it requires attention by the maintenance staff, a red light will show and a buzzer will sound.

All electrical outlets, whether of the explosion-proof type below the five foot level or the ordinary type above the five foot level, are to be made to fit a three-pronged attachment plug. In addition to the two wires ordinarily used, there will be a third one that will connect with the ground. At the equipment end this third wire is to be attached to the casing of the electrical equipment, again as a precaution against the hazards of electrical shock.

This standard was developed at the request of the Safety Committee of the American Hospital Association, which, under the sponsorship of the Council on Hospital Planning and Plant Operation, had studied the problem since 1946. Chairman of the National Fire Protection Association Committee on Hospital Operating Rooms was George H. Buck, Director of the University Hospital of Baltimore. Harriet L. Aberg, Cottage Hospital, Galesburg, Ill., represented the American Association of Nurse Anesthetists; Dr. E. A. Rovenstine, the American Society of Anesthesiologists; Dr. Carl W. Walter, the American College of Surgeons; and Howard A. Carter, the American Medical Association. Additional members of the Committee included representatives of governmental groups, architectural and engineering organizations, the National Safety Council, and the Underwriters Laboratories, Incorporated.

While this standard will undoubtedly continue in effect for some time, it is open to minor amendments from time to time. The Committee proposes to meet early in 1950 to consider recommendations for amendment that may be received as the standard is studied throughout the hospital field and begins to be applied.

INACTIVE MEMBERS

Inactive Members who have not already submitted an inactive application for the 1950 fiscal year should send a request for the new application form to the A.A.N.A. Executive Office, 22 E. Division St., Chicago 10, Ill.

Annual reapplication will no longer be required. If a member wishing inactive status has received an application for this year, it will be satisfactory. However, such member wishing to continue inactive status after September 1950 will be required to submit a new application.

HAZARDS

(*Continued from page* 29)

9. All equipment should have proper grounding.
10. Never permit oil, grease, or readily combustible materials to come in contact with oxygen cylinders, valves, regulators, gages, or fittings.
11. Never lubricate regulators, fittings, or gages with oil or any other combustible substance.
12. Never handle oxygen cylinders or apparatus with oily hands, greasy gloves, or rags.
13. Always clear the particles of dust and dirt from the opening to each cylinder by slightly opening and closing the valve before applying any fitting to the cylinder.
14. Never bring an anesthesia machine to the patient without opening the high pressure valve on the oxygen cylinder previous to so doing.
15. Never permit oxygen to enter the regulator suddenly. Open the valve slowly. When opening the valve, point the face of the gage on regulator away from the operator.
16. Never use oxygen fittings, valves, regulators, or gages for any other service except oxygen.
17. Users should never mix gases of any type in an oxygen cylinder or any other cylinder.
18. Never attempt to use regulators that are in need of repair or cylinders having valves that do not operate properly.
19. Never attempt to repair defective oxygen equipment unless properly qualified by knowledge and experience.
20. Never use oxygen from a cylinder except through a pressure-reducing regulator.

CONCLUSIONS

In conclusion, I would like to repeat: The factors essential for the development of fire or explosion in an anesthetizing area are: (1) combustible gases or vapors, (2) oxygen supply, and (3) ignition source.

These three factors have been discussed in previous paragraphs. Low voltage equipment with low voltage batteries, such as a laryngoscope, is not a hazard.

THE HOSPITAL'S DILEMMA

Kenneth B. Babcock, M.D., F.A.C.S.*
Detroit

In talking to you, I presume I am addressing, for the most part, the day's professional speakers, possibly the odd stray hospital administrator, and an impressive array of the best nurse anesthetists in the country. I do not say the last to be cynical, or with a smirk. This organized group is honestly interested in improving the status of the registered nurse anesthetist and at the same time in giving to the public, or the patient, the best and safest in anesthesia.

However, like all such groups, its own interests and problems and, indeed, fight for survival sometimes blind it to the over-all picture.

As a director and administrator of a large general hospital, in which over 18,000 anesthetics are given a year, and in which there is a school of anesthesia for nurses, I would like to present some of the problems facing us and other hospitals, large and small. Let us look at the record.

There are 6,400 general hospitals in the United States, embracing 1,400,000 beds. There are about 4,500 registered nurse anesthetists and 400 registered physician anesthetists, plus 1,000 unregistered physician anesthetists. That means about one anesthetist per hospital. Obviously there is a very great shortage, and obviously, therefore, anesthesia is an excellent field to enter, at least on the surface.

To enter a school, the student must be a graduate R.N. and in good health and of good moral character. To graduate, the student must give 500 hours of anesthesia. Fine, so far. As a graduate nurse of ten years' experience, she has earned an average maximum take-home pay of $200 a month, or $2,400 a year. From this she must have saved a minimum of $1,000, preferably closer to $2,000, to be able to enter a school of anesthesia. This sum saved must pay for tuition ($100 to $300), room, board, laundry, clothing, insurance, dental bills, and, in fact, all the necessities of normal existence for one year. (It used to be three months.) A year is now the approved length of an anesthesia course. This scares the great majority away because they have not planned to take such a course for the past one to five years and have only thought of it in the last six months and have saved nothing. The G.I. Bill has practically run out, and money from that source will be unavailable in about two years. The student is getting to be, and will soon be, entirely on her own.

Inquiries to other schools of anesthesia on my part show a definite falling off of enrolment. Therefore the present shortage in the field is due to increase because

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Read before the Sixteenth Annual Meeting of the American Association of Nurse Anesthetists, Cleveland, September 26, 1949.

*Director, The Grace Hospital.

the number of graduate nurse anesthetists is decreasing and the number of hospitals increasing. It is also a foregone conclusion that a student nurse anesthetist cannot work her way through school. Among other disadvantages is the fact that she has been away from adequate teaching and learning processes for five to ten years and has got to learn to study all over again. That is the student picture.

Now, please close your eyes and pretend that you are a hospital administrator. You have two very important people to meet. One, Mr. Board of Trustees, and two, Dr. Surgeon. Let us take No. 1, Mr. Board of Trustees.

The Budget is being reviewed by the Finance Committee. The conversation goes like this: "We are losing money. Before we raise rates, and they are too high now, let's see if we can't be more efficient, cut corners, or plug leaks. What about the cost of this school of anesthesia? It seems pretty high. Please explain." And I, as an administrator, answer it this way:

"We take six students every two months. Approximately thirty-six students a year. We feed these thirty-six free for one year. We charge for room $20 a month, which loses money for us. The standards of the Association require one supervisor to each three students. There are practically no qualified academic teachers among nurse anesthetists, so we have to hire an academic teacher or two from the outside. Our professional staff itself, for example, is not qualified to teach the pharmacology and physiology of anesthetic agents. Likewise, to fulfil the obligation of the school for nurse anesthetists, it is necessary to maintain a medical director of the department—they come high; a qualified nurse as first assistant in charge of the office work, details of admission, attendance, and records of the students; another qualified assistant in charge of equipment who can instruct in the care and use of said equipment; and a third assistant as a general supervisor to rotate and also to cover the above two in that we are on a forty hour week. Plus this faculty, we have twelve to fourteen paid permanent anesthetists to staff over fifteen operating rooms and four active delivery rooms in our two hospitals. Only students in the last two or three months are capable of carrying on alone. There are also afternoon and night shifts and emergencies to handle."

Mr. Trustee answers: "I realize the splendid public service this school is performing, but tell me truthfully: Is it costing us more to run the school of anesthesia, utilizing the senior students and so forth, than to hire graduate nurse anesthetists and discontinue the school?" The answer is, "Yes, Mr. Board of Trustees member, it is more expensive to run the school." This statement is true in my hospital right now. We are not discontinuing the school as yet but are watching the trend very carefully, and it is a possibility.

Now keep your eyes closed and listen to Dr. Surgeon. It is easier. He talks louder, and I quote:

"It was a lousy anesthetic from that student. Why can't we have graduate anesthetists like other hospitals?" He is soothed, and it is explained that students must learn to be proficient, must work on cases, or we won't have any anesthetists after a while, and he is being a big help. He is mollified. His ego has been appealed to. That is only a minor gripe.

Now forget the school, and just listen to the surgeon who is a member of the staff of a hospital with ten operating rooms and graduate anesthetists being paid the current rate for anesthetists. We say to him: "Dr. Surgeon, you can't operate today. We have had to close two operating rooms. We have written, telegraphed, begged, but can't get more anesthetists. I realize that it is costing us money to be closed down, and we are not able to serve the public as we are meant to do, and it is hurting your practice, too." His answer is, "You're darned right it is. Raise their salaries. Get some somehow. I'm losing both money and patients." "Yes, Dr. Surgeon." So the hospitals outbid one another by upping salaries but basically not solving the problem, merely aggravating it. Now you may open your eyes.

I have painted a rugged picture by telling none of the good things. You have heard "The Hospital's Dilemma."

1. There is a shortage of nurse anesthetists, and the enrolment in schools of anesthesia is dropping off.
2. The cost of a school for nurse anesthetists, conforming with your standards of today, is prohibitive except to university hospitals.
3. The answer is not raising nurse anesthetists' salaries and hospital rates further.

To me there are, at present, two possibilities. First, let us take a tip from our sister R.N. She is a highly trained nurse whose duty it is to supervise, give therapeutic or specialized care, and let the lower grade of practical nurse, or trained aide, give the bedside care. Nursing is slowly but surely coming to that conclusion. You are going to have to do the same thing possibly. You are competing with medical anesthetists of seven years' training to your one. You are going to have to increase your standards and make a course more costly and difficult to compete. At the same time, if you are wise, you will have a two to four months' course for practical anesthetists, under your jurisdiction, who can handle normal cases, give routine anesthetics, and know enough to call for your early help when needed. She will not spend hours on a curriculum of history of anesthesia, physiology and pharmacology of anesthetic agents, and a host of other academic considerations. That is rather a large order, but it can be done, I believe.

A second possibility is that your group might go to four, geographically well located universities and say, "Give us a basic anesthesia course of one term, or approximately six months, in the academic curriculum of anesthesia." This would concentrate the teaching and avoid duplication and save time and money. From there the students would go out to approved hospitals and receive practical training of four to six months. Call it an internship or residency if you wish.

We, in hospital administration, are doing that for future administrators, and the laboratory technicians do the same thing for their people. Why can't you?

Above everything else I wish this paper to make no threats or to imply no drastic moves. However, I am very cognizant of the fact that a medical anesthetist went to the head of a large hospital in Detroit and said to her, and later to me, "There is no need for this shortage of nurse anesthetists. If you will offer to pay $10 to $15 more than what they are giving now to a group of nurses, I will teach them practical anesthesia in two months. They should be made to agree, or sign a contract, to stay at least a year. They can't ever really leave the hospital because their qualifications are good only here. I will bear the responsibility of their teaching. The hospital is safe because the law says the surgeon is the responsible person in all operations unless a special medical anesthetist is contracted for. You can't lose. You know we taught them in the war." I repeat again that this is not told as a threat. Both of us indignantly told him, "No." But, very seriously, it is an out-and-out ultimate possibility if the shortage increases and ethics go by the board in order to acquire anesthetists—any anesthetist.

In closing I can only repeat: Something must be done. It should be done by you yourselves before the straw breaks the camel's back, and hospitals or medical anesthetists or surgeons or all of them try to run your business, because, as history tells us, other people will, if you won't.

A. A. N. A.

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THE ROLE OF UNIVERSITIES IN THE EDUCATION OF NURSE ANESTHETISTS

Helen L. Bunge, R.N., M.A.*
Cleveland

The formality of the subject as stated is a little frightening to me and perhaps to you also. However, I am glad to explore with you for a little while this afternoon the whole subject of what the university has to offer the nurse anesthetist.

At the outset let me explain the way in which I am using the term *university*. I chose that term advisedly, as it usually indicates an institution of higher learning offering not only the so-called liberal arts courses and programs, as do most of our undergraduate colleges, but also educational programs in certain professional and special fields, such as business administration, engineering, law, medicine, dentistry, home economics, and nursing. Because the university is typically composed of a number of colleges, its opportunity for a broad community service is great. However, there is no clear-cut differentiation between the offerings of a college and those of a university. Indeed, I can mention a so-called university that offers a typical liberal arts college program and none of the types of professional and other specialized programs usually offered by a university. On the other hand, I also can name an institution that calls itself a college that offers certain kinds of professional and special education usually offered by a university.

The reason for giving this rather elaborate definition of a university is that ideas of what universities should be are always in process of change. Universities are constantly in the process of becoming something different from what they are today. To understand the role of the university in your community, you must learn something about its history, the policies of the university as determined by the faculty, the extent of its financial support, its current offerings, and the demands of the public it serves. All of these factors, plus others, influence the activities of any university at any particular time.

I shall confine my remarks this afternoon primarily to the role of the typical university rather than to that of the college.

THE UNIVERSITY AND PUBLIC NEED

We, in the teaching field, are a little sensitive about being told that we live in an ivory tower quite protected from the rough and tumble of daily life, that we are armchair philosophers, or that our heads are in the clouds and our feet are not on the ground. The university exists to serve public need. And, although there may be a difference of opinion as to what the public—the citizens of your community, for example—

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needs from the university it supports, the university will be a vital force in the community only so long as it does meet public need. It must, therefore, respond to changes in the demands of the citizens. For example, today in graduate nurse programs in schools of nursing we are having requests for clinical courses, such as medical and surgical nursing, which was not the case fifteen years ago. Again, we have seen in the last twenty years a much greater inclination on the part of nurses in service agencies to go to the university for help in solving service problems, such as help in developing a program for performance evaluation of personnel, or in building an in-service program of one kind or another. I give these examples to bear out the statement that the university is quicker to respond to public need and is doing so at a faster rate than it is sometimes given credit for.

KINDS OF SERVICES AVAILABLE FROM THE UNIVERSITY

But to be specific, what kinds of assistance can the university give a group like nurse anesthetists?

1. In the first place, there are physical facilities: Classrooms and meeting rooms are one example, and libraries another. Although libraries are organized and conducted by the university primarily for the use of its own students, they serve a much broader public. Fortunate, I believe, is the hospital nursing service that has the use of a university nursing library that is up-to-date, comprehensive, and well run, under the direction of a trained librarian. Service agencies, like hospitals, often find the problem of maintaining an adequate library for their nursing personnel a knotty one. Some mention, too, should be made of the availability of film libraries and other visual aids now being developed in the modern university.

Am I fair in saying that nurse anesthetists, like busy nurses in other fields, may not half make use of the library facilities on their own doorsteps? Yet I believe most practicing nurses will quickly admit that the availability of a good library makes keeping up with developments in the professional field comparatively easy.

2. In the second place, members of university faculties are available as speakers for meetings and are available to help with institutes, seminars, and workshops organized by nurse anesthetists, for example. University personnel often are asked to serve as consultants on projects undertaken by nurses in agencies that do not have the prepared personnel necessary. For example, certain directors of nursing service in this city have turned to the school I represent for assistance in solving problems of ward management. It is not unusual for a specialist group such as yours to turn to university personnel for help in problems in curriculum, accreditation, performance rating, teaching methods, anatomy and physiology, or pharmacology. I understand that at present you are using this kind of assistance in the field of accreditation.

3. Then there are university activities of a general nature, such as lectures and conferences, that are open to the community at large. Many of these opportunities would not be available if there were no university.

4. And lastly, the university offers courses and organized programs of work, often leading to a degree, that aim to give the serious student a sounder preparation in

her field of interest. For example, in schools of nursing we have programs in teaching and supervision and administration, averaging perhaps a year or a little more in length, to give nurses preparing for responsibilities in schools and service agencies a solid foundation for their continuing professional growth. A number of the courses in these programs may not be offered by the college of nursing itself. For instance, general courses in counseling, in business management, and in teaching methods may be applicable to situations in a variety of fields, and students of nursing may register for them in various departments of the university. The principles of counseling are the same regardless of the situation in which they are used. Programs such as these are of concern and interest to the anesthetist who is carrying administrative or teaching responsibilities, as well as to the nurse who is preparing for a teaching position in a school of nursing. The nurse, of course, must add to this educational foundation as the demands of her professional field make it necessary, and as interests in her own personal and professional growth impel her.

We have just been speaking of the programs a year or so in length that contain professional content for preparing the teacher or administrator. Many of the values of college education are to be derived from the more general liberal arts courses that add to our general usefulness as citizens and to the richness of our personal lives. It is hopeless to try to enumerate here the wide range of courses available to you, but let me mention a few. What about the courses in English, in literature, or in the communication arts such as writing and speaking? What about music, and the other arts that can add so much to the breadth of our personal lives? Have you ever felt the need for a better knowledge of the history of people in this world in order better to understand the problems before this nation today? What about the sciences? Not only anatomy and physiology, which have been major segments of your professional preparation thus far, but geography, or perhaps botany? And, should you be planning for the time when you can visit some of our Spanish-speaking neighbors, what are you doing to familiarize yourself with their language and their culture? These examples suffice to show that the opportunities are limitless to pursue your special interests through regular credit-bearing courses being offered by the university.

But we must still mention the short courses and institutes now offered by many universities in addition to their regular credit-bearing courses: courses in hat making, dressmaking, in furniture painting and home decorating for the domestically inclined; courses in moving picture appreciation and on the great books of all time. I noticed that this university will offer a thirty hour course soon on "The History, Enjoyment, and Criticism of Jazz." These are but illustrations to show you the scope of interest of the modern university. The problem today is not one of finding an interesting course, but of being able to select one from among the many which beckon.

UNIVERSITY DEPARTMENTS THAT MAY BE OF ASSISTANCE TO NURSE ANESTHETISTS

The nature of the assistance you desire and the way in which the university is organized will, of course, determine the department of the university to which you would turn for help at any particular time. If you are unfamiliar with the organization of the university you wish to approach, there is always the opportunity to discuss your peculiar needs with the office of the president or his appropriate deputy, who will refer you to the proper department. Certainly, you quickly recognize the contribution that each of the following university colleges or departments can make to the continuing education of nurse anesthetists: Liberal arts, medicine, dentistry, pharmacy, nursing, business administration, extension, and adult education.

Determining the Purpose of Your Educational Venture

I am speaking to you now as individuals deciding how the university can serve you, individually. In making up your mind, ask yourself these questions and others like them:

A. What is it that you want from this educational experience—something for your development as a person, as a citizen, or as a professional worker? Although these aspects of our lives are interrelated, they may be cultivated and enriched in different ways. This is not so idle a question as it may at first appear to be. Is there any truth to the accusation that nurses, more than some other groups, take too lightly their responsibilities as citizens and that they give up or are denied the opportunities for personal growth and interests that are taken seriously by women in other fields of work? If this statement has a kernel of truth in it, nurses *can* do something about it.

B. Is it possible for you to take a leave-of-absence to attend a university outside of a commuting range, or must you limit yourself, perhaps, to the offerings which you, in a community distant from a university center, can bring from the university? Assuming that you live in a university center, how much of your free time, and that is precious little, can you devote to university study? Do you wish to plan a program of study that will meet the requirements for a degree, or do you wish to limit yourself to an occasional course or to those noncredit-bearing activities that are offered from time to time?

C. What use will you make of the opportunity for additional work in your field of special interest? Can you put it to some practical use in your organization? Can you help colleagues with certain of their problems? Do you see ways to put your educational background to work to improve the service of your agency or school? Do you see ways in which the university can help your staff to tackle some of its problems?

By defining some of your real goals and purposes before beginning your university study, you will feel best satisfied with what you are getting from it.

The University's Dilemma

Although the university wishes to meet a wide range of requests coming from a variety of groups in the community, its departments, of course, have to make decisions as to what they can do at any particular time. Requests for special courses, institutes, and workshops coming to departments are acted upon in the light of the following considerations:

A. Is the request within the scope of the department's program? Is this department or college the logical one to meet this request?

Are there other organizations that can meet this request better?

B. Is this request as urgent as other requests now before the department or college for consideration? Is there as great a demand for this service as there is for other types of service the department is now being asked to give?

C. Does the department have the facilities to meet the request, or can it secure these facilities? Important considerations here are, of course:

1. Plant facilities (rooms, sometimes living facilities, library, etc.).
2. Personnel equipped to do the job needed.
3. Financial support.

In making requests, remember that sometimes what a university cannot do at one time it will be free to do at another. To juggle personnel, to find additional personnel from outside of the school, to plan for adequate classroom and teaching facilities, and, not least important, to arrange for financial support for a new project usually mean careful and considerable planning ahead.

Summary

In conclusion, I wish to emphasize certain points which seem particularly important:

A. The university exists to meet the needs of the individuals whom it serves.

B. It tries to meet these needs through organized programs of work and also through institutes, workshops, and short courses on a noncredit basis. Usually, the offerings will be given on the campus of the university, but others may be given as extension work.

C. You nurse anesthetists, whom the university serves, also have a role to play in making the university really effective by:

1. Informing yourselves and others of the current offerings of universities, and taking advantage of those which meet your needs.
2. Advising the university of developing programs in your field that indicate the changing needs and interests of nurse anesthetists.
3. Concerning yourselves with ways of supporting university programs.

By supporting the university in these three ways, you will aid it in making a maximal contribution to community life.

CURARE

(*Continued from page 22*)

curare, it is not affected by administration of neostigmine or physostigmine as an antidote.

Curare in Chest Surgery

Some anesthetists recommend the use of curare to abolish respirations during chest surgery so that respirations can be controlled. We do not give large doses of curare to any patient who has a pathologically reduced vital capacity and believe that its use postpones return of the cough reflex postoperatively. Other conditions which contraindicate the use of curare are severe liver and kidney damage, myasthenia gravis, asthma, and any other similar condition in which pulmonary ventilation is impaired.

Summary

I should like to repeat what we have all been taught and have read so many times: Curare is very valuable to the anesthetist but is a dangerous drug in the hands of the inexperienced and should never be administered without adequate facilities at hand for artificial respiration by a trained person. From a purely personal standpoint, I would never permit the use of curare on any of my own family without first making sure that the anesthetist was adept at intratracheal intubation.

ANESTHESIA COMES OF LEGAL AGE

Emanuel Hayt, LL.B.*
New York City

Time was when the administration of anesthetics was not considered a legitimate part of the care of surgical patients. It was taught, if at all, in the earliest days by the preceptor system as the "pouring of ether," an activity unworthy of and not needing the skill of a physician, requiring no judgment and little manual dexterity. According to Rovenstine,[1] nurses were the logical persons for this work, not because they lacked good judgment or manual dexterity, but because they could be trained by physicians. In time, as the number of such nurses increased, they taught one another in the technics of surgical anesthesia.

The general practitioner administered anesthetics only when someone better trained than he was not available. In some hospitals anesthesia was delegated to the least experienced intern. It is small wonder then that the nurse trained in anesthesia was welcomed by both the medical profession and hospitals. For her, the work was not a disagreeable chore but an important branch of the medical art.

Gradually, through their own experiences and assisted by clinical observations, medical practitioners became aware of the tremendous potentialities present in this infant specialty of medicine. Physicians exchanged information and experiences about anesthesia. The American Society of Anesthesiologists was organized; its publication *Anesthesiology* provided an opportunity for continuous educational experience.

With the establishment of the American Board of Anesthesiology as a section of the American Medical Association, attention was directed to standards and abilities. Approved residencies in hospitals for training in anesthesiology were set up through the participation of the Council on Medical Education and Hospitals. In addition to their residency program, departments of anesthesia included postgraduate instruction for physicians engaged in anesthesiology.

Development of Surgical Anesthesia

Strangely enough, it was neither a doctor nor a nurse who was responsible for the birth of modern surgical anesthesia. Joseph Priestley, who in the late eighteenth century isolated carbon dioxide, oxygen, and nitrous oxide, was a chemist. Another chemist, Sir Humphrey Davy, first observed the effects of nitrous oxide on an aching tooth and the relief that was produced. Even the show business, in performances of "ether frolics," demonstrated to audiences the hilarious and boisterous effects of the

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Read before the Sixteenth Annual Meeting of the American Association of Nurse Anesthetists, Cleveland, September 27, 1949.

*Counsel for A.A.N.A.

[1] Rovenstine, E. A., and Papper, E. M.: Graduate education in anesthesiology. J.A.M.A. 134: 1279-1283, Aug. 16, 1947.

fumes on people who volunteered as subjects. Dr. W. T. G. Morton, a dentist, convinced the medical profession during the course of an operation that surgical anesthesia was a practical application of the use of ether vapor.

Since that time the scientific world not only has accepted surgical anesthesia as an indispensable surgical and dental aid but has investigated the anesthetic properties of many other gases and substances until, today, in the practice of modern medicine, anesthesiology is a highly technical and respected member of the family of medical specialties.

Anesthesiology is a specialty whether engaged in by a licensed physician or a registered professional nurse. The stepchild has been adopted as a lawful and recognized member of the medical family. In an article by Tovell and Steven,[2] appears the statement: "It is in no boastful spirit and it is without exaggeration that we venture to claim that the tremendous advances in surgery in recent years parallel directly the advances in anesthesia and the care of patients before and after operation."

Progress in anesthesia has been fostered by both the nursing and medical professions. Neither profession should seek to deny to the other due credit for the growth of the sturdy and healthy infant that has now reached legal maturity as a medical specialty.

ADMINISTRATION OF ANESTHETICS BY NURSES

Yet one of the burning questions today is whether nurse anesthetists, physician anesthesiologists, or both should function.

In a pronouncement by the American College of Surgeons,[3] criticism was directed at those physician anesthesiologists who sought to give the impression to the public that it is unsafe for experienced nurse anesthetists to administer anesthetics. "In view of the inadequacy in number of the physician anesthesiologists and in view of the splendid record of achievement of the nurse anesthetists," declares the statement, "institutions engaged in the training of nurses for this purpose should be encouraged to continue their programs."

A similar rebuke was administered by the Southern Surgical Association[4] in a resolution that stated that "this attempt to persuade the public that there is grave danger in a surgical operation if the anesthetist is not a certified medical specialist is already decreasing the number of efficient well-trained nurse anesthetists and forcing surgeons to perform recently developed complicated operations with anesthetics administered by young hospital interns or general practitioners, neither of whom [has] special training or experience in the administration of an anesthetic."

Hospital Management, one of the outstanding independent journals in the hospital field, reported in the April 1948 issue the results of a survey that it undertook.[5] Illuminating are the following conclusions: "Taking the largest group, those using nurse anesthetists alone, first, we find that stated objections to physician anesthesiologists fall into four broad classes. These are:

"1. Physician anesthesiologists are not available in adequate numbers to handle all anesthesia.

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[2] Tovell, R.M., and Steven, R.J.M.: Anesthesia and the role of anesthesiologist of today. J.A.M.A. **141**:8-13, Sept. 3, 1949.

[3] ACS resolution on nurse anesthetists. A.A.N.A. News Bulletin **2**:6, March 1948.

[4] Resolution on nurse anesthetists. J. Am. A. Nurse Anesthetists **16**:70, Feb. 1948.

[5] Who should give anesthetics? Here's what hospitals think. Hosp. Management **65**: 31-33, April 1948.

"2. They charge rates that are too high for many patients to pay, in some cases rates that approach the cost of the surgery itself.

"3. Many of them are poorly trained. This refers principally to general practitioners who are giving anesthesia without having been certified by the American Board.

"4. They are more interested in surgical procedures than in the administration of anesthetics. This leads to divided attention during operations."

The advantages of the nurse anesthetist are set forth as follows:

"1. The nurse anesthetist gives her undivided attention to the anesthesia. She is not primarily interested in the surgical procedure, which is often the case with the physician anesthesiologist.

"2. There are far too few physician anesthetists to care for the amount of anesthesia that is required in hospitals throughout the country.

"3. There is no reason why the well-trained nurse anesthetist cannot understand the physiological and pharmacological basis of anesthesia, especially when such training has been gained by exposure in a medical school.

"4. Unfavorable propaganda concerning any phase of the patient's care, whether by physician, nurse, or anesthetist, definitely undermines the psychosomatic care of the patient.

"5. Experience with nurse anesthetists in charge of anesthesia over a period of years has proved that such procedure is safe."

LEGALITY OF NURSE ANESTHESIA

Another argument against nurse anesthesia has been scotched: namely, that administration of anesthetics by a nurse violates the laws on medical practice.

That a nurse who administers anesthetics practices medicine cannot be denied, but the act is legal everywhere when performed under the direction and supervision of a licensed physician, even though he may know less about it than she. Her license to practice nursing, of course, does not entitle her to diagnose, treat, or prescribe for patients. The professional services of the nurse are confined to the carrying out of treatments prescribed by a physician. It is the right of the physician to select the anesthetic, check the patient's condition, and determine the nature of the treatment or operation.

The courts have definitely declared their attitude on the subject of nurse anesthesia. In the surgery nurses, in preparing for, and during the progress of, an operation, do not practice medicine when they are carrying out the orders of the physicians to whose authority they are subject, for supervision by the surgeon is the controlling element that removes the procedure from medical practice.

The legal status of the nurse anesthetist is incontrovertible. It is required only that she have the proper training and experience to be a qualified member of the surgical team.

Recently, however, there has been a trend to enact statutes for nurse qualification to administer anesthetics and her certification. Arizona has had such a law for some years, which provides that a registered nurse may administer anesthetics under the direction and in the immediate presence of a licensed physician or surgeon provided such nurse has taken a prescribed course of anesthesia at a hospital in good standing or is a graduate in the science of anesthesia administration from some recognized school or college. Kentucky, Ohio, and Washington have similar laws.

The latest bill for licensing was introduced early this year in the New York State Legislature. The bill sought to include the administration of anesthetics as the practice of medicine. No person would be permitted to practice anesthesiology unless he or she had been licensed by the State Department of Education. Questions for the examination would be submitted by the Board of Medical Examiners.

The law would not apply to registered professional nurses who had administered anesthetics under the supervision of a duly licensed physician prior to the effective date of the act; nor to a graduate of a school of nursing that taught the administering of anesthetics and who was graduated prior to July 1, 1953, and was thereafter licensed to practice as a registered professional nurse.

Objections to this bill were filed by the A. A. N. A., the New York Association of Nurse Anesthetists, and the Hospital Association of New York State. Within less than a week the bill was reported defeated in committee.

It was pointed out to the Legislature that physicians are licensed by the State and so are nurses. Specialists in medicine are not licensed by the State but are certified by their various specialty boards. Under his license to practice medicine, a physician is entitled to administer anesthetics even though he has no specific license for that purpose and has had no experience.

No nurse anesthetist administers anesthetics unless it is done under the supervision and direction of a duly licensed physician. Moreover, she has had special training and experience in that field and is generally more capable than a doctor who has had no experience in that branch of medicine. No responsible hospital would avail itself of the services of a nurse anesthetist unless she had been properly approved by the medical staff.

Hospitals, it was further asserted, were having difficulty in getting a sufficient number of nurse anesthetists. A licensing law would keep competent nurses away from the State and reduce the number of available anesthetists. Only a few states require licensing.

Such a law might be desirable were it not for the fact that a licensing requirement would increase the scarcity of anesthetists. The statement was recently made that there are less than 400 medical anesthesiologists to serve 6,000 to 7,000 hospitals and more than 3,700 nurse anesthetists.[6]

It must be remembered that many hospitals employ considerably more than one nurse anesthetist and that only one physician anesthesiologist is necessary to head a department of anesthesiology of a hospital. According to Dr. Frank R. Bradley,[7] the ratio should be ten nurse anesthetists for every physician anesthesiologist. The truth is that medical anesthetists and nurse anesthetists are in great demand. The supply of either or of both seems to be considerably less than the need.

So widespread and well recognized is the use today of the nurse anesthetist that she must assume legal responsibilities that once were minimized or ignored. She must stand on her own feet as an independent member of the surgical team.

LIABILITY INSURANCE COVERAGE

For many years it was the belief of nurse anesthetists that they were protected from damage claims for injuries to patients either because the surgeon or hospital was solely responsible or because the hospital and doctor were protected by liability or malpractice insurance.

It was not until some correspondence was received from a nurse anesthetist in Colorado who had been made a party defendant to a lawsuit together with the charitable hospital by which she was employed that the matter of legal responsibility came under scrutiny.

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[6] Storm, J. M.: The truth about anesthetists. Trustee 1:1-4, March 1948.

[7] Bradley, F. R.: The challenge to the nurse anesthetist. J. Am. A. Nurse Anesthetists 15:19-21, Feb. 1947.

The patient claimed her left eye had been injured in some manner while she was under the influence of the anesthetic in the operating room. She alleged the permanent full loss of use of her eye and consequent damage of $25,000. The husband demanded an additional $5,000 for medical expenses and loss of services. Liability insurance was carried by the hospital but not by the anesthetist.

After more than a year of waiting for the case to be reached for trial, a settlement of $2,000 was made by the insurance company of the hospital; the action against the anesthetist was dismissed. While the result was a happy one for the anesthetist, the intervening period during which the case was pending was a disturbing one.

The A. A. N. A. felt that it was time to undertake a study of the legal responsibility of the nurse anesthetist and to find the best solution to the problem that might be revealed.

Legal research disclosed a considerable volume of cases in which nurse anesthetists were sued for injuries suffered by patients either as a result of the administration of the anesthetic or during anesthesia. One of the first conclusions reached was that a free-lance anesthetist is legally responsible to the same degree as any other anesthetist, in case of an anesthesia accident or death, even though she administers the anesthetic at the request of the surgeon.

Court decisions in the various states were examined. In Alabama a case held that the nurse anesthetist who merely administers the anesthetic to the patient is not liable for the negligence of the operating surgeon, but that she is responsible for her own carelessness. Another case, in Kentucky, holds that the anesthetist must devote her attention solely to the administration of the anesthetic and to the patient's physical condition; she need not give attention to the removal of the surgical sponges at the termination of the operation. It is the duty of the surgeon, says a Minnesota case, to take heed of the patient's condition when there is a warning from the anesthetist of unfavorable reactions. The fact that the patient dies while under the influence of the anesthetic is no evidence of negligence on the part of the anesthetist or surgeon, declares a New Hampshire court, for there must be proof of a negligent act that caused the death.

In New York the court stated that, when the patient receives a burn in the operating room, an explanation is due from those who were present. Another case in New York declares that the hospital is not liable for any medical acts of negligence performed by nurses.

In the ordinary relationship of employer and employee, the employer as well as the employee is chargeable with the negligence of the worker. To that rule there is an exception: a charitable hospital is not responsible for injuries caused by a nurse or nurse anesthetist or a physician, even though he or she is employed by the hospital on salary. The nurse or physician does not have immunity from claims for injuries due to negligence.

It was found that many hospitals do not carry liability insurance because such institutions in those

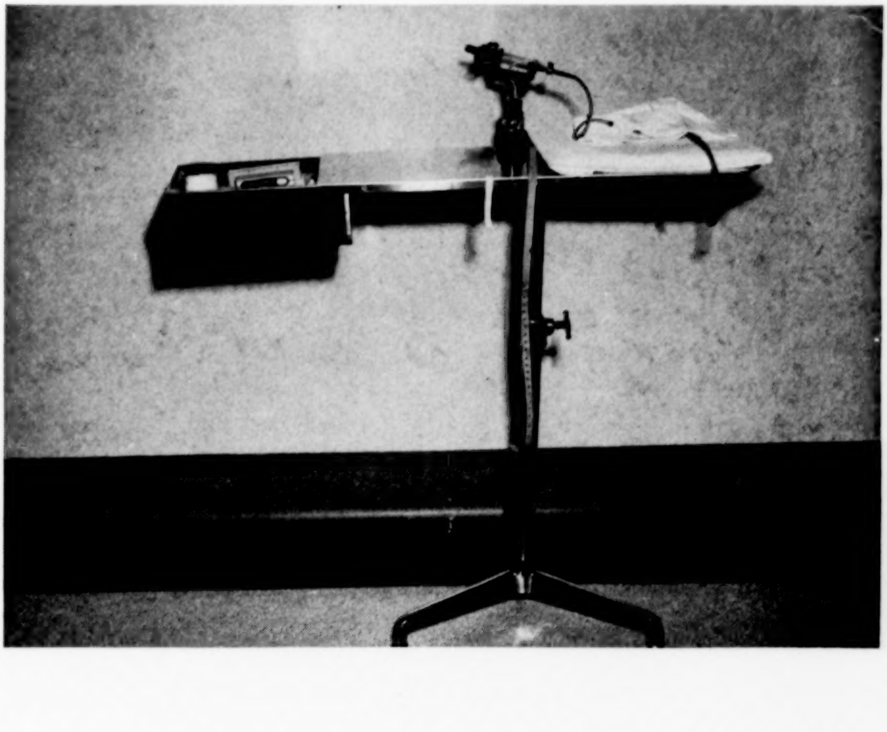
(*Continued on page* 60)

NOTES

When anesthetists get together, they talk about anesthesia. They talk about gadgets, special technics, and interesting cases. This section of NOTES was originated so that anesthetists could exchange ideas in writing as they do in conversation. Send in your contribution now. Other anesthetists will be helped by it.

Arm Rest and Stand for Intravenous Administration of Pentothal Sodium. — The illustrated stainless steel, easily transportable stand for intravenous administration of pentothal sodium is adjustable to various heights. A drawer that can be fixed in an open position contains the essential drugs and equipment for pentothal sodium anesthesia. A cup containing the bottle of pentothal sodium solution and a syringe holder are attached to one side of the armboard. A strap for supporting the arm is also attached.

The apparatus eliminates the need for a preparation tray and may be set up and moved, ready for use, into the operating room.—Sr. Rudolpha, R.N., Springfield, Ill.



LEGISLATION

Emanuel Hayt, LL. B.*

A Question of Insufficient Anesthesia.[1]—The action was for the recovery of damages due to the surgeon's alleged malpractice in operating upon the patient's left eye for the removal of a cataract. The patient contended that the doctor only incompletely performed the operation, failed to remove the cataract, and caused her injury; that the operation was interrupted and injury caused because she moved in the course of the operation; that her movement was caused by pain; that the prevailing approved practice in the medical profession is the preoperative administration of an anesthetic that will achieve complete anesthesia and render the patient insensible to pain during the operation; and that, if an interrupting movement occurs, it is due to "insufficient anesthesia."

At the close of the patient's testimony, the case was dismissed. On appeal, however, the court held that the case should have been allowed to go to the jury, for the jury could have found that the surgeon was guilty of malpractice in that he began the operation when the administration of the anesthetic was insufficient or else before it had obtained sufficient effect. A *prima facie* case had been established. It was an error to dismiss the case, and a new trial was therefore ordered.

Gauze Left in Patient's Abdomen after Operation.[2]—A piece of gauze, claimed the patient, was left in his abdomen after an operation. Both he and his wife testified that his outer body before the gauze was removed was full of pus and blood, and that everything was saturated with pus and blood. They swore a new incision was made immediately prior to the removal of the gauze from his abdomen. However, the piece of gauze, used as an exhibit at the trial, was not shown to have any blood stains upon it.

The judgment in favor of the patient was reversed on appeal, and a new trial was ordered on the ground that the finding implicit in the verdict of the jury, that the surgeon negligently left the gauze in the body of the patient, was against the weight of the evidence.

Liable for Neglect to Install Sideboards.[3]—It was alleged that the patient sustained personal injuries as a result of the hospital's failure to supply and install sideboards upon a bed that she occupied while a patient under the hospital's care. Evidence was introduced and received to present questions for determination by the jury, stated the court, as to whether or not a determination had been made by an attending physician that such sideboards were necessary as a protective measure, and as to whether or not a nurse associated with the hospital had been directed to see to it that the sideboards were installed. There was also evidence that the hospital authorities had been directed by the doctor to put up the sideboards and had neglected to do so. The omissions that were alleged to have caused the injuries were such that the hospital could have been held liable therefor, regardless of its status as a charitable institution. The judgment against the hospital was affirmed.

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*Counsel for A.A.N.A.

[1] Colin v. Smith, 91 N.Y.S. 2d 713.

[2] Appelt v. Timpone, et al., New York Supreme Court, Second Judicial Department, October 10, 1949, 17 CCH *Negligence Cases* 406.

[3] Gordon, Admr., v. Harbor Hospital, Inc., New York Supreme Court, Appellate Division, Second Judicial Department, October 10, 1949, 17 CCH *Negligence Cases* 402.

FEES OF EMPLOYED ANESTHETISTS. — A registered professional nurse employed for several years by a surgeon as office nurse and anesthetist administers inhalation anesthetics for him and gives avertin and sundry intravenous anesthetics. At times the surgeon personally administers spinal anesthetics, while the nurse renders such assistance as may be necessary.

In the case of private patients the nurse anesthetist, who administers the anesthetic or assists the surgeon by whom she is employed, sends the charges for her services directly to the patient. In workmen's compensation cases when herniotomies are performed, the surgeon administers a spinal anesthetic, which his nurse observes; she stands by prepared to render such resuscitative measures as may be needed. She gives her bill to the hospital, which adds her fee to the hospital charges sent to the insurance company. On receipt of payment the hospital reimburses the nurse anesthetist. The hospital includes her fee as a matter of convenience and to assist the nurse anesthetist. This hospital does not employ a medical anesthesiologist but has a nurse anesthetist in charge of the department of anesthesia.

The insurance carrier has refused to pay any part of the bill. It is asserted that the hospital has no right to allow a registered nurse "to function as a physician," give anesthetics, and collect fees for such services; that she may not render a bill through the hospital; that her fee is included in the customary hospital operating room fee; that only a licensed physician may submit a bill for anesthesia services; that the nurse is practicing medicine in violation of the Medical Practice Act; that she cannot independently undertake to give anesthetics and charge a fee for such services; that the administration of anesthetics is the practice of medicine.

A registered professional nurse who administers an anesthetic under the supervision or direction of a duly licensed physician does not practice medicine within the meaning of the Medical Practice Act, for she does not treat, diagnose, or prescribe for physical ailment or disease. Her rendition of a bill when she performs the services under the supervision of a physician is not the practice of medicine.

When the nurse is an employee of the physician, the cost of her services should be part of the doctor's fee. It is not a case of the doctor's acting as agent for the patient and procuring a nurse anesthetist, as he would in obtaining the services of a private duty nurse. The nurse cannot be both employee and independent contractor; she cannot serve two masters and be compensated twice.

In workmen's compensation cases whatever remedy exists for the nurse is statutory. If the anesthetist is an employee of the hospital, her services are included in the operating room charge. If she is acting independently and as an employee of neither the doctor nor the hospital, her services are in the same category as physiotherapy by a licensed physiotherapist.

It is improper for her to submit a bill for an anesthetic administered by the doctor when she stands by to assist as would any other nurse employed by the physician. There is no valid reason for the hospital to include her charges in its bill.

THE NEWS

1950 INSTITUTE FOR NURSE ANESTHETISTS

Anatomy Demonstrations and Clinics Arranged

From the program prepared for the 1950 Institute for Nurse Anesthetists, the five day meeting at the Hotel Stevens, Chicago, February 13-17, promises to be exceptional in its value to anesthetists wishing an up-to-date appraisal of agents and technics.

One day will be devoted to each of the following subjects: intratracheal anesthesia, intravenous anesthesia, inhalation anesthesia, curare in anesthesia, and balanced anesthesia. In conjunction with lectures on intratracheal anesthesia, anatomy demonstrations will be conducted at St. Mary of Nazareth Hospital.

Key speakers for the various sections will be: Drs. W. B. Adams, Ball Memorial Hospital, Muncie, Ind., and Joseph G. Kostrubala, Chicago (intratracheal anesthesia); Drs. C. D. Anderson, Gordon W. Curry, George A. Roberts, and Charles B. Groenke, Presbyterian Hospital, Chicago (intravenous anesthesia); Drs. John S. Gray, Mary Karp, Edith Eason, and Neal Davis, Wesley Memorial Hospital, Chicago (inhalation anesthesia); Drs. Lou Wright, New York City, and Harold L. Harris, St. Francis Hospital, Evanston, Ill. (curare); Drs. John S. Lundy and John Waugh, Rochester, Minn. (balanced anesthesia).

Six clinics are being arranged at Chicago hospitals for Tuesday, Wednesday and Thursday morning.

A tea on Monday afternoon is to be given by the Illinois Association of Nurse Anesthetists for all registrants.

The chairman of the A.A.N.A. committee co-operating with Dr. Charles T. Dolezal, Institute Coordinator of the A.H.A., in preparing the program is Helen Vos, instructor of anesthesia at Wesley Memorial Hospital, Chicago. Members of her committee are Harriet Aberg, Mae B. Cameron, Edith Helen Holmes, Opal M. Schram, and Sr. Reginella. Local arrangements are to be handled by Mary Duray, Marie Garrity, and Edith McGinley.

Certificates will be awarded those students who attend all sessions.

QUALIFYING EXAMINATION

Applications with completed transcripts for the eleventh qualifying examination for membership must be in the Executive Office before April 10. The examination will be held on May 8. Students who will complete the course between April 10 and May 8 may submit applications if the directors of the schools are willing to send in the completed transcripts before April 10.

COMMITTEE APPOINTMENTS

Appointments to A.A.N.A. committees were made at the postconvention meeting of the Board of Trustees in Cleveland, September 30, 1949. The members of standing committees are appointed for one year and are eligible for reappointment, unless otherwise specified in the *Bylaws.* The committee members whose names are published here have accepted the appointments.

Advisory to Approval
  Helen Lamb, chairman
  Mabel Courtney
  Mary O'Carroll
  Miriam G. Shupp
Approval
  Margaret Sullivan, chairman
  Hazel Blanchard
  Dorothy Finley
  Sr. Seraphia
  Esther M. Stephenson
Approval of Minutes
  Pauline Henry, chairman
Convention Arrangements
  Dorothy Ball, chairman
Credentials
  Frances Kocklauner, chairman
  Ann Dickerson
  Marjorie Petkash
Curriculum
  Mary Costello, chairman
  Evelyn Auld
  Sr. Agnes deBoheme
Education
  Edith Aynes, chairman
  Marie N. Bader
  Marie Callori
  Mary Costello
  Helen Vos
  Janet McMahon, ex officio
Educational Exhibits
  Marie N. Bader, chairman
  Harriet Aberg
  Helen C. Anastor
Educational Fund
  Sr. Seraphia, chairman
  Helen Lamb
  Marion W. Thomas
Examination
  Janet McMahon, chairman
  Evelyn Auld
  Martha Lundgaard
  Ruth Satterfield
  Sr. Rudolpha
Finance
  Exire O'Day, chairman
  Gertrude Fife
  Rose Gish
Government Relations
  Julia Baines, chairman
  Cleo Bopp

Still smiling after the first lap of the tenth qualifying examination, November 14, 1949, the candidates at St. Joseph's Hospital, Fort Worth, Texas, pose with the proctor, Gertrude Tuley.

CALENDAR OF COMING EVENTS

February 13-17	Institute for Nurse Anesthetists, Chicago
February 15-16	Midsouth Post-Graduate Assembly of Nurse Anesthetists, Memphis
February 24-25	Annual Meeting, Alabama Association of Nurse Anesthetists, Montgomery, Ala.
March 7-9	Annual Meeting, Texas Association of Nurse Anesthetists, Galveston
March 22-24	Annual Meeting, Ohio Association of Nurse Anesthetists, Columbus
March 27-28	New England Assembly of Nurse Anesthetists, Boston
April 5-7	Southeastern Assembly of Nurse Anesthetists, St. Petersburg, Fla.
April 24-27	Western States Assembly of Nurse Anesthetists, Seattle
May 2-4	Tri-State Assembly of Nurse Anesthetists, Chicago
May 17-19	Upper Midwest Assembly of Nurse Anesthetists, Minneapolis
May 24-26	Middle Atlantic Assembly of Nurse Anesthetists, Buffalo
September 18-21	SEVENTEENTH ANNUAL MEETING, AMERICAN ASSOCIATION OF NURSE ANESTHETISTS, ATLANTIC CITY

Ruth Cook
Madeleine King
Institute
Helen Vos, chairman
Mary Duray
Marie Garrity
Edith McGinley
Nominating
Martha Jackson, chairman
Jessie Compton
Rosella Crotty
Frances Fanning
Edna Peterson
Planning
Gertrude Fife
Laura Hoffman
Myra Van Arsdale
Program
Ann Butterworth, chairman
Margherita Powers
Public Relations
Verna Bean, chairman
Marie Kraft
Mary Regus
Pauline Spangler
Publications
Opal Schram, chairman
Harriet Aberg
Betty Lank
Agnes Lange
Ruth Schierman
Revisions
Hazel Peterson, chairman
Palma Anderson
Pauline Henry

SPECIAL COMMITTEES

History
Gertrude Fife, chairman
Florence McQuillen
Virginia Thatcher, ex officio
Personnel Practices
Josephine Bunch, chairman
Minnie Haas

JOURNALS WANTED

Several back issues of the JOURNAL are needed to complete duplicate files at the Executive Office. These issues are vol. 1, 1933; vol. 8, no. 3 (August) 1940; vol. 11, no. 3 (August) 1943; vol. 14, no. 2, part 1 (May) 1946; vol. 17, no. 1 (February) 1949. Will persons who wish to dispose of any of these issues please notify the Executive Office.

Laura Hoffman, President, Texas Association of Nurse Anesthetists.

TO THE MEMBERS OF THE AMERICAN ASSOCIATION OF NURSE ANESTHETISTS:

For fifteen years, I have been the Treasurer of our association. During that time it has been a great satisfaction to me to see our organization grow and our financial position remain secure. Most years, we have been able to balance the budget, and some years we have put aside substantial sums. This has meant security in case of emergency, and it has also made funds available to us at this time when important projects are to be launched.

During my term of office it has been necessary to reorganize the books twice in order to meet the needs of a rapidly growing organization. The Treasurer's office was moved to Chicago in 1946, and in the three year interim, important details of business procedure have been ironed out and stabilized.

In a few weeks, the state organizations will be holding their annual meetings. At those meetings the states will place in nomination names of those persons whom they think best fitted to fill the offices in the national organization. It is the first step in the election of officers, and it gives the states an opportunity to register their desires.

Some of the states may again desire to place my name in nomination. In order that those states may not lose the opportunity to nominate one who will allow her name to appear on the ballot, I am asking, at this time, that my name not be placed in nomination.

This does not mean a lessening of interest in the affairs of our association on my part. I am strongly of the opinion that the time has come when the best interests of the Association would be served by withdrawing my name so that another may have the privilege of serving you as Treasurer.

I appreciate the confidence you have placed in me over the past years. I thank you for the support, help, and understanding accorded me in the fulfillment of my office.

GERTRUDE L. FIFE, *R.N., Treasurer*

Officers of the Mississippi Association of Nurse Anesthetists for 1950: (left to right) Melba R. Carmichael, Alberta K. Shurley, and Irene M. Mason.

MAIL RETURNED

Mail has been returned to the Executive Office from those members whose names are listed here. This means that they are not receiving the JOURNAL, *A.A.N.A. News Bulletin,* and other communications from the Association. Will any one who knows the address of any "lost" member please notify the Executive Office or ask her to do so.

Sylvia Abraham
Mrs. C. D. Aspinall
Rose Barton
Stella Mary Basara
Mrs. Leona Beneigh
Beulah G. Binding
Mrs. Mary F. Bockus
Edna M. Boesel
Dorothy R. Boyer
Nettie O. Burnette
Dorothy A. Burton
Catherine M. Busco
Adela L. Cadra
Janet K. Clark
Blanche Clause
Betty F. Cochran
Mrs. Minnie L. Corn
Mrs. Bernadine M. Cottle
Ava J. Cox
Christine E. Cox
Mrs. Carmen S. Davis
Mrs. Joan Dow
Carmen A. Eckhart
Georgia H. Erd
Mrs. Dorothy B. Fee
Mrs. Alice G. Fisler
Anne R. Foster
Raymond E. Gessler
Hilda M. Graham
Mamie B. Hamilton
Mrs. Dorothy B. Harper
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Alice E. Harrison
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Betty J. Homola
Mrs. Tommie P. Howlett
Marie C. Jacobs
Leda E. Jelinek
Emilia K. Jensen
Catherine L. Johnson
Helen M. Keller
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Mary Louise King
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Mrs. Mechtildes C. Martinez
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Mrs. Della F. Meyer
Kathryn R. Monson
Adalene W. Montgomery
Paula J. Morin
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Mrs. Marie W. Ross
Mrs. Evelyn P. Rushing
Honor G. Savoia
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Mrs. Ruth J. Schaefer
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Sr. M. Camilla Wolotkiewicz
Sr. M. Pacis
Martha S. Solberg
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A. Helen Teto
Audrey J. Tryon
Mrs. Virginia D. Underwood
Ilah M. Van den Beldt
Erma F. Wagner
Mrs. Loree R. Warwick
Mrs. Josephine B. Wells
Mrs. Martha F. White
Mrs. Elizabeth F. Wilson
Mary A. Younger
Mrs. Victoria W. Youngren
Margaret R. Zahara

ABSTRACTS

BRENNEMAN, R. E.: Management of anesthesia for the allergic patient. Ann. Allergy. 7:534-539, July-Aug. 1949.

"A survey of literature and case reports suggests that people suffering from some allergic condition are more susceptible to reaction from anesthetic agents and drugs. . . . If the skin is involved at the proposed site of puncture, skin lesions would contraindicate the use of local, regional, or spinal anesthesia, eliminating possibility of any secondary infection. With this exception, patients with such a pathologic condition will tolerate any anesthesia. One should be certain, however, that the allergic skin condition is not due to some drug or agent that is about to be used for premedication of the anesthetic procedure. Local or topical application of drugs to involved mucous membranes of the nose and throat will increase edema, swelling, and secretion. If a vasoconstrictor is added to the anesthetic solution, the action may be favorable. Irritating general anesthetic agents, such as ether and vinethene, add insult to injury by increasing the mucosal secretions. Agents which cause little or no irritation to the mucous membranes are more advantageous. . . .

"The asthmatic patient presents the greatest problem because of difficulty in breathing, increased pulmonary secretions, edema, and congestion. It is important that these persons be well oxygenated and hyperventilated at all times, especially while under the influence of general anesthesia with depressed respiration. . . . Nitrous oxide and ethylene are not contraindicated at any time, as long as the patient is well oxygenated. . . . Allergy, in association with drugs and agents used in connection with anesthesia, may be very troublesome to the anesthetist. Very few patients if any, are ever tested for allergy or hypersensitivity to drugs or agents. The discovery of unfavorable reactions is usually made by history of some previous unsatisfactory result or by a reaction occurring for the first time. Hypersensitivity to the commonly used inhalation agents is negligible. A few cases of ether allergy, however, have been reported. . . . Reports of allergic reaction resulting during cyclopropane anesthesia are not common. . . . Penthothal, in addition to the unfavorable reactions which will be seen with the barbiturates (mentioned later), may cause coughing, hiccoughing, and sneezing. . . . Sensitivity to spinal anesthetic agents is said to have occurred in rare instances. In all probability the technique, not the agent, was to be blamed. Pontocaine applied topically may produce immediate fatality. If used in the eyes, it may cause itching and edema of the lids, face, and parotid regions. Conjunctivitis, chemosis, and edema of the epithelium of the cornea are likely to occur. Pontocaine may cause urticaria, pain in the chest, and a feeling of choking, while nupercaine drops in the eye may initiate a reaction similar to pontocaine. Procaine may cause severe burning and itching at the site of injection, with accompanying dermatitis and vesicular areas. The neighboring lymphatics may be involved. Metycaine may also cause a dermatitis and itching. No matter what agent is used, one should always be mindful of a general reaction and be ready to administer immediate treatment for fall in blood pressure and convulsions.

"Although the degree of toxicity varies among the agents, it is important to remember, however, that all will produce symptoms that may become evident if sufficient dosage is used. . . . Since epinephrine is frequently used in anesthesia and allergy, it is well to remember that it, too, may produce toxic symptoms. . . . Opium and its derivatives may cause agitation, restlessness, dizziness, fainting, dyspnea and wheezing. Nausea and vomiting, together with violent and persistent retching, may follow the use of morphine. Abnormal respiratory depression may result. The patient may experience pain simulating acute gallbladder colic because of excessive contraction of the sphincter of Oddi. Tremors, delirium, convulsions and insomnia may occur in addition to urticaria, skin rashes, pruritus and sneezing. . . .

"The barbiturates often cause circulatory and respiratory depression and tend to increase the sensitivity of the laryngeal reflex. Allergic reactions present cutaneous lesions, erythematous dermatitis, and localized swelling, particularly of the eyelids, cheeks, or lips. The patient has a tendency to become excited and to appear inebriated. He may experience pain of a neuralgic, arthritic or myalgic type. Lassitude, vertigo, nausea, and vomiting are also possible in allergic reaction. Phenobarbital has been known to cause an exfoliative dermatitis which may be fatal. Rarely do patients present hypersensitivity to atropine; a rash may appear, especially on the face, neck and upper part of the trunk. There is circumoral pallor, tachycardia, mydriasis, and anhidrosis. Body temperature may be elevated with associated mental disorientation. There is dryness of mouth and difficulty in swallowing, restlessness, and headaches. The unfavorable reactions of scopolamine are similar to those of atropine."

LEWIS, M. S., AND BODDIE, J. B., JR.: Vinbarbital sodium for obstetric amnesia, analgesia and anesthesia. A report of 3,000 cases. South. M. J. 41: 820-829, Sept. 1948.

"Our observations indicate that vinbarbital sodium can be used with relative safety for the mother and with minimal effect upon the infant. Administration is simple and does not require the attendance of an anesthetist. Restlessness, a great disadvantage of barbiturates, can be easily and readily controlled. And finally, it is effective in a large percentage of patients . . . . We have used it in 3,000 deliveries . . . . Two thousand, four hundred and forty-four received vinbarbital sodium orally in combination with scopolamine and, in addition, vinbarbital sodium intravenously for the completion of labor. The average dose was nine grains orally and ten grains intravenously. There were 556 patients who received no other medication than vinbarbital sodium intravenously for induction of analgesia and anesthesia. The average dose was 15 grains. . . . Of the 2,978 infants born alive, 80.9 per cent breathed and cried spontaneously; 12.6 per cent were slightly asphyxiated, and required only carbon dioxide and oxygen for resuscitation; 5.4 per cent were classified as moderately asphyxiated, and required tracheal catheterization in addition to carbon dioxide and oxygen; 0.9 per cent were classified as markedly asphyxiated, and required tubbing in addition to the above procedures. The time elapsing between the administration of the drug and delivery or the size of the dose of vinbarbital sodium

What does

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mean to you?

Common usage defines the term as "the act of taking or receiving something offered." But acceptance by the medical profession implies a far more serious use of the word. For after a product is accepted, it is *relied* on, and the consequences are great should the product later be found lacking. Before acceptance can be won, the product must have demonstrated its unfailing performance. Its dependability must have been *proven*. Then, and then only, will it merit medical acceptance.

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played insignificant roles in the incidence of asphyxia in this series . . .

"Of the premature infants, 15.3 per cent were classified as slightly asphyxiated, and 9.9 per cent were classified as moderately to markedly asphyxiated. The incidence of neonatal deaths was 3.9 per cent. The incidence of asphyxia was greater and seven of the eight neonatal deaths occurred in the seven and the seven and one-half months infants. . . . The corrected fetal mortality was fourteen, or 0.4 per cent. Vinbarbital sodium appeared to have no effect on the duration of labor. . . . Mild to moderate degrees of restlessness occurred in 23.4 per cent. All were promptly controlled by additional administration of intravenous vinbarbital sodium. Complete amnesia was obtained in 70 per cent of all patients who received vinbarbital orally with scopolamine. Complete amnesia was obtained in 99 per cent following the intravenous administration of vinbarbital sodium. No patients were encountered in whom this method of analgesia and anesthesia was contraindicated. No inhalation anesthesia was required in any instance. The incidence of postpartum hemorrhage was not increased. The majority of patients slept soundly for from one to eighteen hours following delivery. There was one maternal death in the entire series. It was due to eclampsia, ..."

LEGAL AGE

(*Continued from page* 48)

states are not legally liable for personal injuries to patients.

From a study of many cases throughout the country, the Association felt that there was a legal responsibility on the part of nurse anesthetists similar to that of physicians. No physician of any standing today thinks malpractice insurance is unnecessary. One having to defend a lawsuit must first incur the expense of defense. The next matter for concern is whether or not there will be a recovery of damages. Adequate insurance, on the other hand, would pay both the cost of defense and any damages awarded to the patient.

The members of the medical and dental professions have assured themselves of ample protection through insurance sponsored by their professional societies.

With nurse anesthesia established today as a specialized profession and full recognition being given to the legal status of the anesthetist, a search was undertaken for an insurance company that would be willing to undertake the new type of risk. As a result there has been made available exclusively to members of this association a policy of liability insurance that recognizes, by its provisions, the professional position of the anesthetist and provides for protection similar to that for physicians. The policy is designed solely for nurse anesthetists who are members of the A.A.N.A.

PROLONGED SURGERY

(*Continued from page* 25)

has been adequate, and there has been less of the tissue trauma that usually accompanies poor relaxation. There is no doubt that the use of minimal amounts of general anesthetic agents has been an important factor in the improved postoperative course of our patients. Experimentally it has been shown that fifteen minutes of deep anesthesia is as shock producing as two hours of light anesthesia, and the incidence of postoperative nausea and vomiting is greater when deep anesthesia is used.

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BOOK REVIEWS

I HAVE BEEN READING a group of books that deal primarily with subjects not directly concerned with anesthesia. They are each written on some phase of nurses' training. On first glance it would seem that these books have no bearing on the subjects that interest anesthetists. On closer examination it appears that much of value could be learned from them.

Brethorst[1] has written a text that should be of interest to directors and instructors in schools of anesthesia for nurses. Classrooms, libraries, and teaching facilities are discussed in a manner that makes the material adaptable to a specialized subject as well as to general nursing. Qualifications for a teacher, definitions of learning, the psychology of teaching and learning, and study technics and methods are but a few of the many phases of teaching covered in this book. The table of contents is detailed. After each chapter there are questions or exercises, as well as a list of references and suggestions for supplementary study.

The sixth edition of Hansen's *Review of Nursing*[2] has been revised with increased attention to "enhancing its value as a teaching device and study guide." This book serves to remind us of the rapid changes that are taking place in the entire nursing field, as well as in the special field of anesthesia. The questions are presented in various ways with many situation questions, some in story form. In addition to its value as a teaching guide, this book has a wealth of information in concise form. The section on basic principles of surgical nursing is an excellent example of the information of special interest that is available.

Francis[3] "attempts to present in the smallest possible compass the essential facts of human anatomy." The drawings add to the value of the text. This book would be an excellent basis for the more detailed study of anatomy necessary for nurse anesthetists.

Sister Leo Marie Preher and Sister M. Eucharista Calvey[4] have presented the cultural and vocational aspects of sociology in professional education. The book is written to help nurses develop an interest in society and interhuman relations. Many references for additional reading are listed after each chapter. References used in the text are listed as footnotes.

With only casual interest I began to read *Vocational Nursing for Home, School and Hospital* and the accompanying *Handbook of Recorded Notations*.[5] These books are the work of Alice L. Price, R.N., B.S., director of nurses, Memorial Hospital, Alton, Ill.; formerly nursing arts instructor, Toledo Hospital, Toledo, Ohio; assistant director of nurses, Edward W. Sparrow Hospital, Lansing, Mich.; director of nurses, Memorial Hospital, Rockford, Ill.; member of the Army Nurse Corps.

The information is presented for the vocational nurse who, accord-

---

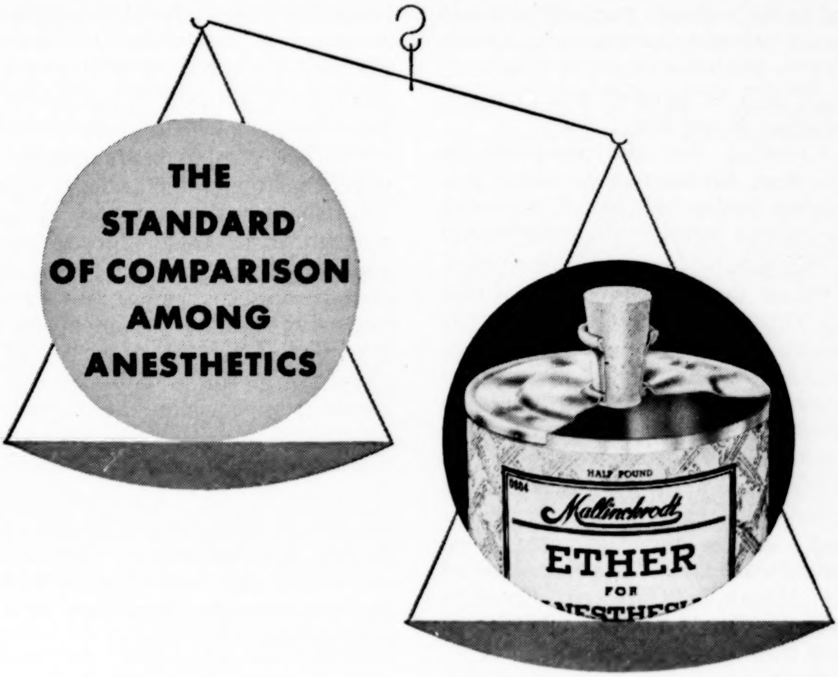
[1] Brethorst, Alice B.: *Methods of Teaching in Schools of Nursing* (Philadelphia: W. B. Saunders Co., 1949).

[2] Hansen, Helen F.: *A Review of Nursing*, ed. 6 (Philadelphia: W. B. Saunders Co., 1949).

[3] Francis, Carl C.: *Introduction to Human Anatomy* (St. Louis: C. V. Mosby Co., 1949).

[4] Preher, Sister Leo Marie, and Calvey, Sister M. Eucharista: *Sociology with Social Problems Applied to Nursing* (Philadelphia: W. B. Saunders Co., 1949).

[5] Price, Alice L.: *Vocational Nursing for Home, School and Hospital* (St. Louis: The C. V. Mosby Co., 1948).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ing to the author's suggestion, could be the title of a "worker who spends nine to twelve months in classroom work and in gaining practical experience in nursing."

Knowing that the place of the practical, or vocational, nurse has become well established, it was with increasing interest that the duties of this group of nurses were studied. Most of the procedures are within the category of duties ordinarily conceived as being within the capabilities of a practically trained nurse. However, some of the procedures for special care raised the question in this reviewer's mind as to the place at which practical and professional care should be delineated. Among these procedures of special care are: "Special Care of the Mouth," "Care of Pressure Sores," "Bed Shampoo," "Larkspur Cap" (for treating head lice), and preoperative and postoperative care. Each of these subjects is treated impartially as to relative importance. The outline of treatment of bedsores requires slightly more than 300 words, as does the outline for postoperative care. A page of outlined notes follows the one and a third pages on postoperative care. Here it is hoped that much explanation would be given to the novice.

The symptoms of external bleeding, internal bleeding, and shock, as well as the treatment for each condition, are encompassed in 132 words. The vocational nurse is advised to notify the head nurse of signs of bleeding, but this admonition fails to appear in the outline of the treatment of shock.

To those of us who have administered anesthetics and have followed the postoperative course of many patients, this summary outline is appalling. That such duties should be considered within the scope of duty of a vocational nurse is amazing, especially in view of the author's apparent willingness to place these persons in a position of not requiring constant supervision:

"If the reader bears clearly in mind that the trained aide is a person usually trained on the job who always works under direct supervision and the practical nurse is a person who has had a much more extensive training and is capable of working under the direction of a physician or nurse without need of constant supervision there need be no confusion as to the use of either title and the duties related to each."

Surely if these important phases of patient care are to be assigned to the practical nurse, then much more thorough and accurate information must be included in the curriculum.

CLASSIFIED ADVERTISEMENTS

NURSE ANESTHETIST—For small general hospital in northwestern Pennsylvania with active surgical and obstetrical service. Salary open. Apply: Box L-10, Journal A.A.N.A., 22 E. Division St., Chicago 10, Ill.

WANTED: Graduate nurse anesthetist in a modern well equipped, 200 bed Michigan hospital, located in lake area in close proximity to metropolitan Detroit. Five anesthetists on staff. $285 base pay with $10 step increases at 6, 12, 24, and 36 months. Excellent cafeteria meals. Uniforms laundered. Write: Director, Pontiac General Hospital, Pontiac, Mich.

WANTED: Nurse Anesthetist. Monthly salary $282.50 plus $25.00 bonus; 44 hour week; liberal sick leave and vacation. National and territorial holidays range from 12 to 15 days annually. Three full-time anesthetists employed. Apply: Superintendent of Nurses, Hilo Memorial Hospital, Hilo, Hawaii.

WANTED: Nurse anesthetist for 200 bed general hospital, close to Chicago. Ideal working conditions; medical director. Apply: Box M-10, Journal, A.A.N.A., 22 E. Division St., Chicago 10, Ill.

NURSE ANESTHETIST for 100 bed general hospital located in southwest Virginia. Salary commensurate with ability and training. Social security, UCC Benefits, group life insurance plan, two weeks paid vacation, one week sick leave with pay, also full maintenance in addition to salary. Apply: H. E. Allen, Clinch Valley Clinic Hospital, Richlands, Va.

WANTED IMMEDIATELY: NURSE ANESTHETISTS for 700 bed general hospital. Pleasant working conditions. Salary open. Complete maintenance. Liberal employee benefits. Apply: Personnel Director, Grady Memorial Hospital, 36 Butler St., S. E., Atlanta, Ga.

WANTED: Nurse anesthetist for general work, including obstetrics. Salary $250 plus complete maintenance. Department directed by medical anesthetist. State age and experience. Apply to: Director of Anesthesia, St. Mary's Hospital, W. Palm Beach, Fla.

WANTED: Experienced Nurse Anesthetists: Hawaii, $310 plus maintenance; Mississippi, $350 plus maintenance; Ohio, $275 plus maintenance; Oregon, $open, plus maintenance; Texas, $325 plus maintenance; South Carolina, $300 plus maintenance. American Hospital Bureau, 705 Carnegie Hall, Cleveland, Ohio.

NURSE ANESTHETIST: General hospital. Ideally located 30 miles from Nashville, Tenn. Salary $300, also room and board furnished. Periodic raises, vacation with pay, sick leave. Hospital located in college town. Rutherford Hospital, Murfreesboro, Tenn.

NURSE ANESTHETISTS for large general hospital; salary $3720.20 per annum; yearly salary increase; 40 hour 5 day work-week; overtime, when required, at time and one half. Annual accumulative leave for vacations and sickness. Maintenance furnished, if desired at $300 per annum. Retirement benefits. Apply: Superintendent, Gallinger Municipal Hospital, Washington 3, D. C.

NURSE ANESTHETIST: 180 bed general hospital. Salary open. Apply: Director, The Chester County Hospital, West Chester, Pa.

WANTED: Anesthetist for 200 bed hospital. Salary open. Apply to: Administrator, Leila Y. Post Montgomery Hospital, Battle Creek, Mich.

WANTED: Two nurse anesthetists, one to act as chief anesthetist, in new 100 bed hospital to open this coming year. Salary open. Large amount of major surgery. Apply: Superintendent, Worthington Hospital Association, Worthington, Minn.

ONE NURSE ANESTHETIST: 150 bed hospital; $300 per month and full maintenance. Department directed by medical anesthetist. State experience. Apply to: Director of Anesthesia, St. Francis Sanitarium, Monroe, La.

WANTED AT ONCE: Two nurse anesthetists, 165 bed general hospital, with active surgery. Salary open. Apply: Sister M. Annunciata, Administrator, Mercy Hospital, 144 State St., Portland 3, Maine.

WANTED: Nurse anesthetist, member A.A.N.A. $300.00 per month plus maintenance. Excellent working and living conditions. Wire or write: Superintendent, Davis Hospital, Pine Bluff, Ark.

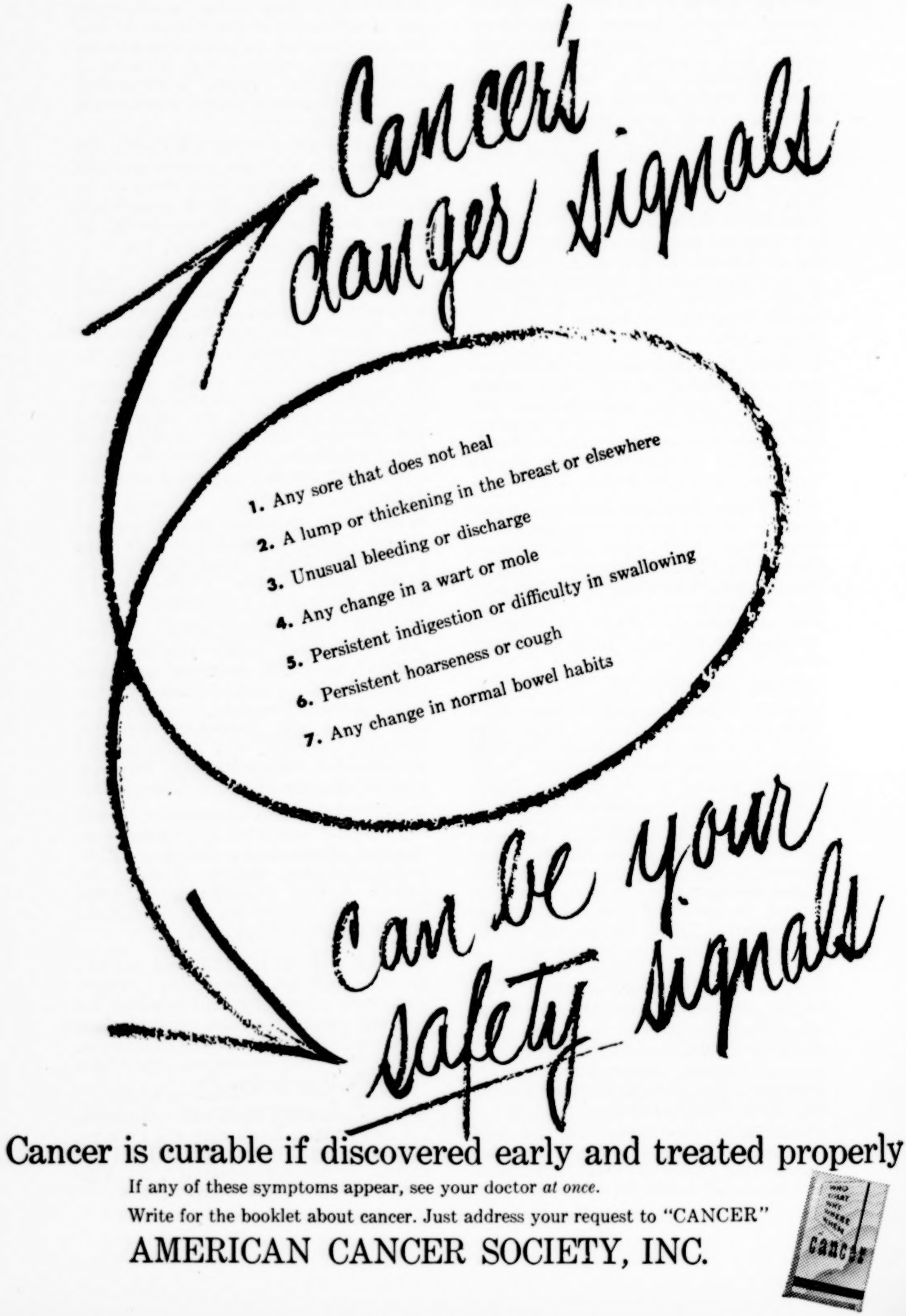
WANTED: Qualified nurse anesthetist for 175 bed hospital. Quota of three anesthetists. Salary range $300 to $350. Write: Administrator, Lynchburg General Hospital, Lynchburg, Va.

NURSE ANESTHETISTS: 475 bed general hospital. Salary $290 to start. Yearly raises. 5% premium p.m. and night duty. Time and one half for overtime. Annual vacation, accumulative sick leave, and retirement benefits. Housing, laundry, and meals offered at minimum charge. Apply: Superintendent, Hurley Hospital, Flint, Mich.

WANTED: Nurse anesthetist in 200 bed hospital with staff of 3 nurse anesthetists; directed by full-time M.D. anesthesiologist. Salary $300.00 per month. Apply: Department of Anesthesiology, University of Arkansas Hospital, Little Rock, Ark.

NURSE ANESTHETIST for 260 bed general hospital. Increasing department now consisting of 1 medical anesthetist and 5 nurse anesthetists. Pleasant living and working conditions. Apply to: Administrator, Polyclinic Hospital, Harrisburg, Pa.

NURSE ANESTHETIST: Obstetrical department. Beginning salary, $285.00 monthly with meals and uniforms. Write: Administrator, St. Vincent's Hospital, Jacksonville, Fla.


Cancer's danger signals
can be your safety signals
cancer

1. Any sore that does not heal
2. A lump or thickening in the breast or elsewhere
3. Unusual bleeding or discharge
4. Any change in a wart or mole
5. Persistent indigestion or difficulty in swallowing
6. Persistent hoarseness or cough
7. Any change in normal bowel habits

Cancer is curable if discovered early and treated properly

If any of these symptoms appear, see your doctor *at once*.

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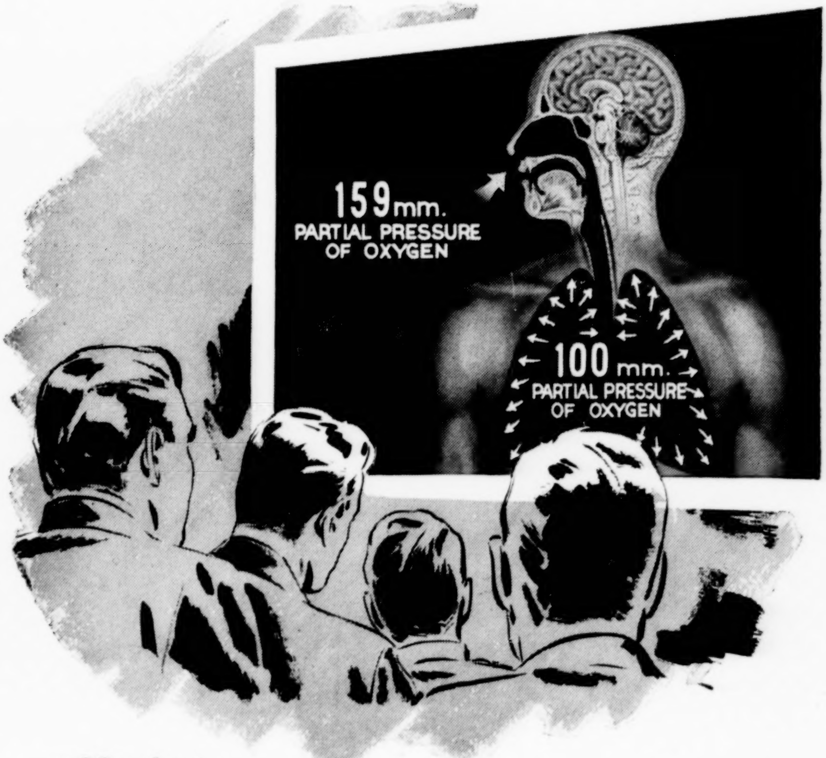

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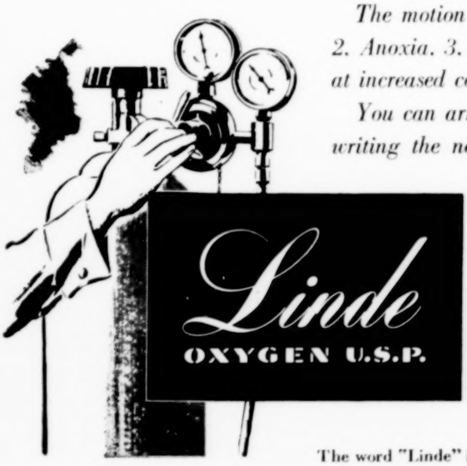

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